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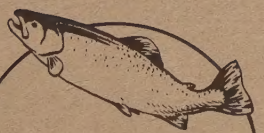

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FISH AND WILDLIFE SERVICE

Explanatory Note

The series embodies results of investigations, usually of restricted scope, intended to aid or direct management or utilization practices and as guides for administrative or legislative action. It is issued in limited quantities for the official use of Federal, State or cooperating Agencies and in processed form for economy and to avoid delay in publication.

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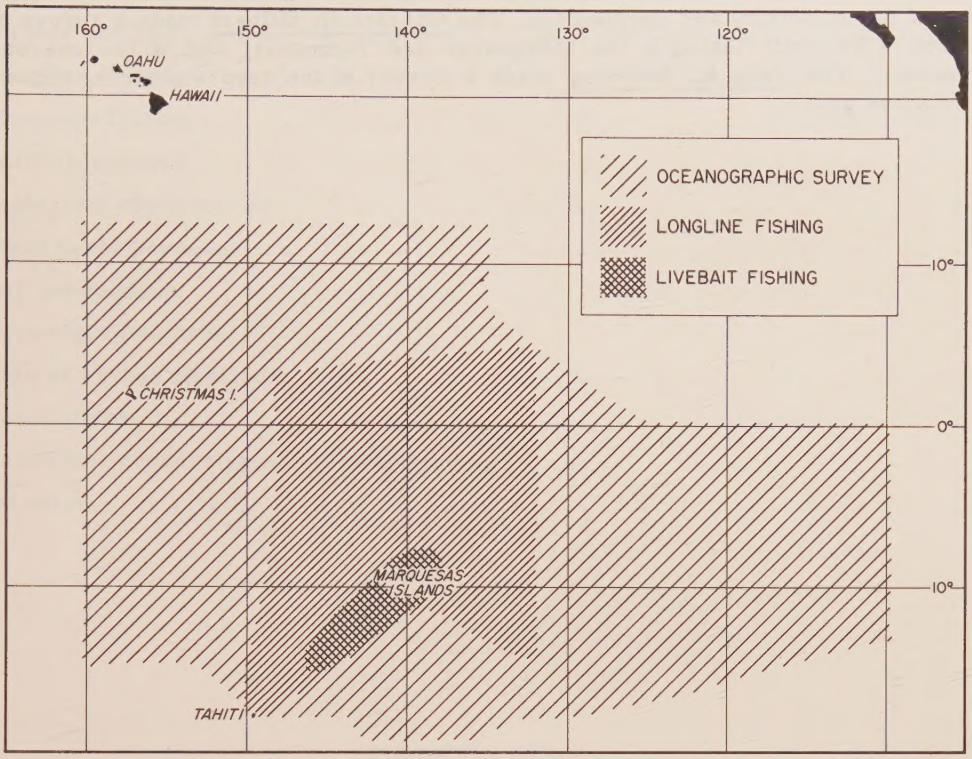

MARQUESAS AREA OCEANOGRAPHIC AND FISHERY DATA, JANUARY-MARCH 1957

By

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and
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U. S. Fish and Wildlife Service
Honolulu, T. H.

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ABSTRACT

This report presents physical, chemical, and biological observations by a 3-vessel survey of the portion of the southeastern Pacific Ocean which is centered in the Marquesas Islands. The expedition was conducted during the southern hemisphere summer, January-March 1957. The methods for field collection of data and laboratory analysis of samples are described. The observed data are presented without analysis. The Hugh M. Smith made physical, chemical, and biological observations in order to define the features of the oceanic circulation and describe the distribution and abundance of phytoplankton and zooplankton. The Charles H. Gilbert made a survey of the stocks of tuna available to live-bait fishing in the Marquesas and Tuamotus, and of the tuna-bait resources in the Marquesas. The John R. Manning made a survey of the deep-swimming tunas available to fishing with longline gear.

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This report presents the record of observed data from a survey of that portion of the southeastern Pacific Ocean centered in the Marquesas Islands. It is the second POFI report concerning this area; the first (Austin 1957) contains the results from a similar endeavor during August-September 1956. The surveys are part of a program undertaken by the Pacific Oceanic Fishery Investigations (POFI) to study the tuna resources of the southeastern Pacific. The August-September cruises were also part of a broad-scale coverage of the equatorial Pacific, designated operation EQUAPAC.

To make these data rapidly available to other agencies studying the Pacific Ocean, they are presented here without analysis. Descriptive and analytical reports will follow.

Three POFI research vessels were assigned to the survey, each with a different primary mission. The oceanic circulation and productivity of a broad area about the Marquesas was studied by the Hugh M. Smith. The Charles H. Gilbert obtained a measure of the tuna available to live-bait fishing and surface trolling, while the John R. Manning investigated the availability of deep-swimming tuna to longline gear.

The Smith departed Honolulu January 11, 1957, and returned March 26, after having occupied the oceanographic stations shown in figure 1. The cruise was interrupted by a breakdown on January 31. Repairs were effected at sea, and the cruise resumed on February 24, but with some change in the cruise plan.

The Gilbert departed Honolulu January 11, 1957, and returned March 22, after having conducted surface live-bait tuna fishing and surface trolling in the areas shown in figure 2.

The Manning departed Honolulu January 4, 1957, and returned March 12, after having occupied the longline-fishing stations shown in figure 3.

FIELD PROCEDURES

Oceanography and Meteorology

The Smith occupied 57 oceanographic stations (table 1) during the survey period. Nansen bottle casts were made to a depth of 1,200 meters with 13 bottles per cast. The spacing of the Nansen bottles in the upper 200 meters was determined from the temperature characteristics of a bathythermograph trace obtained just before the hydrographic cast.

Water samples were drawn from each bottle for salinity, oxygen, and inorganic-phosphate determinations. The oxygen determinations were made aboard the vessel by the modified Winkler method. No oxygen samples were taken during the breakdown period. Analysis of samples for inorganic phosphate were also made aboard by use of the hydrazine-sulphate modification of Denige's method (King et al. 1957) and a model B, Beckman spectrophotometer. Phosphate samples collected during the breakdown period, on special casts, and at 7 oceanographic stations were frozen for analysis in the laboratory ashore. All the salinity samples taken during the cruise were analyzed ashore.

In addition to the regular oceanographic stations, two special 300-meter casts with 8 Nansen bottles, spaced according to the vertical temperature characteristics, were made for the purpose of collecting water samples for phytoplankton analysis (see fig. 1). On one regular oceanographic station, additional phytoplankton samples were drawn from bottles at selected depths. All of these samples were shipped to the Institutt for Marin Biologi at Oslo, Norway.

During the cruise, 275 bathythermograph observations were made from the Smith (table 2). Lowerings were made every 6 hours between Honolulu and the Equator. Between oceanographic stations, lowerings were made every 3 hours on the run along the Equator and

every 4 hours along the 110°W. meridian. On the remainder of the cruise, one lowering was made between stations 90 miles apart, and two between stations 120 miles apart. During the drifting period, in addition to station casts, 16 BT observations were taken at various times. BT casts were made just before and after each oceanographic station.

BT observations from the Gilbert numbered 240 (table 3). They were made every 6 hours while running between Honolulu and 11°N., and between the Marquesas and Tahiti, and every 3 hours on runs between 11°N. and the Marquesas. A single lowering was made at each surface fishing station in the Marquesas and Tuamotus.

The Manning cruise data included 240 BT records (table 4). The lowerings were made every 6 hours traveling to, from, and between the lines of longline fishing stations. A lowering was made just after setting the longline gear, just before and after retrieving it, and midway between fishing stations.

Surface water samples for salinity analysis were taken by the Smith at each BT lowering between Honolulu and the Equator, also at each BT lowering between oceanographic stations north of 2°N., and occasionally at BT lowerings during the rest of the cruise. These data are included in table 2.

Surface water samples for the determination of salinity and inorganic phosphate were taken from the Gilbert once a day between Honolulu and 5°N., and at alternate BT lowerings between 5°N. and the Marquesas. Salinity samples were taken at each live-bait fishing station. All samples were analyzed ashore (table 5).

From the Manning, surface salinity samples (table 4) were taken at every other BT cast on runs to, from, and between lines of fishing stations, and at each fishing station.

On all vessels, standard weather observations were made 4 times daily, except they were omitted when the vessels were in bays or harbors. They were made only twice daily during the breakdown period of the Smith, and the 1200 (GMT) observation was not taken on the Gilbert and Manning during fishing periods. The observations, as encoded and recorded on USWB Form 1210-F, are presented in tables 6, 7, and 8.

Water transparency and color observations were made from both the Smith and the Gilbert. The transparency measurements were made with a standard 30-cm. Secchi disc; water color was designated by comparison with the Forel standards. These data are presented in tables 9 and 10.

Productivity observations

The rate of carbon fixation by photosynthesis was determined with the radioactive carbon (C^{14}) method, as developed by Steemann Nielsen (1952) and modified by Doty (King et al. 1957), employing water samples taken from the Smith. Surface inorganic phosphate analyses were obtained simultaneously with the C^{14} determinations. These data are presented in table 11.

Three types of plankton hauls were made from the Smith, all with a 1-meter net of 656 Nitex (aperture width 0.66 mm.). Except during the runs between Honolulu and the Equator, an oblique 0-60 meter, 30-minute haul was made each day at about 1130 local time, at the same time as the C^{14} sampling. Each night between 2000 and 2200 local time, an oblique two-net tandem haul was conducted, sampling at 0-60 meters and 0-200 meters. Immediately following this, paired 30-minute surface tows were made. The station data and plankton volumes are presented in table 12.

Eight 30-minute surface tows, employing a similar 1-meter net, were made from the Gilbert in the vicinity of the Marquesas and Tuamotus. The station data and plankton volumes are presented in table 13.

Surface trolling

Except when otherwise engaged, all the vessels did surface trolling during daylight hours with varying numbers of lines. The catches and related data for each of the three vessels are listed in tables 15, 16, and 17. The common and scientific names of fish caught are listed in table 14.

Longline fishing

Routinely, 60 baskets of 11-hook longline fishing gear were set from the Manning at each fishing station; 38 stations were fished successfully. The gear used was of POFI design, as described by Mann (1955). Pacific herring (Clupea pallasi) was used for bait. The station data and catch per 100 hooks fished are presented in table 18; the catch record in numbers of fish is presented in table 19.

Live-bait fishing

Fishing trials with live-bait were made from the Gilbert on 103 surface tuna schools in the Marquesas and Tuamotus. The Marquesan sardine and goatfish were used as bait. Of the total catch of 4,838 skipjack and 52 yellowfin, 797 skipjack and 10 yellowfin were marked with the POFI type D-2 tag and released, all in the Marquesas area. The station data, catches, and bait used are listed in table 20. The live-bait fishing techniques for surface schools were similar to the techniques of the Hawaiian skipjack fishery, as described by June (1951).

Baitfish surveys

Two procedures were used for conducting baitfish surveys in the Marquesas; day visual scouting and night-light fishing. Visual scouting during the day was done by three or four swimmers, equipped with faceplates, making a "sweep" of the shallow water in the bays and noting the schools of bait-sized fish. Night-light fishing was done with the Gilbert anchored in about 40 feet of water. Marquesan sardines of all sizes were attracted to the diffused light from a floodlight, and the fish were caught alongside the vessel using a "night net" of specialized design. Results of visual scouting, day fishing, and night-light fishing are presented in table 21.

Biological observations

Routinely, the fork length of representative samples of the tunas and bait species was taken and recorded. Station data and length frequency summaries of catches made from both the Gilbert and Manning are presented in tables 22 through 28, inclusive.

During daylight hours on all three vessels, a watch was kept for birds, tuna schools, and aquatic mammals. Summaries of these observations are presented in tables 29 through 32, inclusive.

Field party personnel

Hugh M. Smith
- Barnes Collinson, Master
- Everet C. Jones, Field Party Chief
- Thomas S. Hida, Fishery Aid
- John W. Van Landingham, Physical Science Aid (Chemist)
- Robert T. B. Iversen, Physical Science Aid

Charles H. Gilbert
- William T. Tanaka, Master
- Robert C. Wilson, Field Party Chief
- Heeny S. H. Yuen, Fishery Research Biologist
- Garth I. Murphy, Fishery Research Biologist (first half of cruise)

John R. Manning
- Fred E. Barnett, Master
- Wilvan G. Van Campen, Field Party Chief
- Howard O. Yoshida, Fishery Research Biologist

LABORATORY PROCEDURES

Oceanographic data

The salinity samples were analyzed by the Fajans modification of the Mohr method (Van Landingham 1957). The inorganic phosphate samples were analyzed by the hydrazine sulphate modification of Denige's method (King et al. 1957).

The oceanographic station data were processed by the use of techniques described by Montgomery (1954), Montgomery and Wooster (1954), Stroup (1954), and King et al. (1957). The curves for each station are included in table 1.

Rate of carbon fixation

A detailed description of laboratory procedures for the determination of the amount of C^{14} photosynthetically fixed per unit of time and associated calculations has been given by King et al. (1957). The counting, using a Tracerlab SC16 windowless gas flow counter and a Tracerlab 1000 Scaler or a Nuclear Chicago 161A Scaler, was done at the University of Hawaii, Department of Botany. The results of these measurements are given in table 11.

Zooplankton

The displacement volumes of the plankton collected on oblique and surface tows made from the Smith and the surface tows made from the Gilbert are given in tables 12 and 13. These volumes were determined after removing all fish eggs and larvae, as well as all "jellies" greater than 2 cm. in length. The details of the method are described by Hida and King (1955).

Personnel processing samples and data
(in addition to the authors)

Oceanography - M. L. Godfrey, Physical Science Aid

C^{14} - M. S. Doty, Professor of Botany, University of Hawaii
M. Oguri, Junior Botanist, University of Hawaii

Zooplankton - T. S. Hida, Fishery Aid

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VAN LANDINGHAM, J. W.
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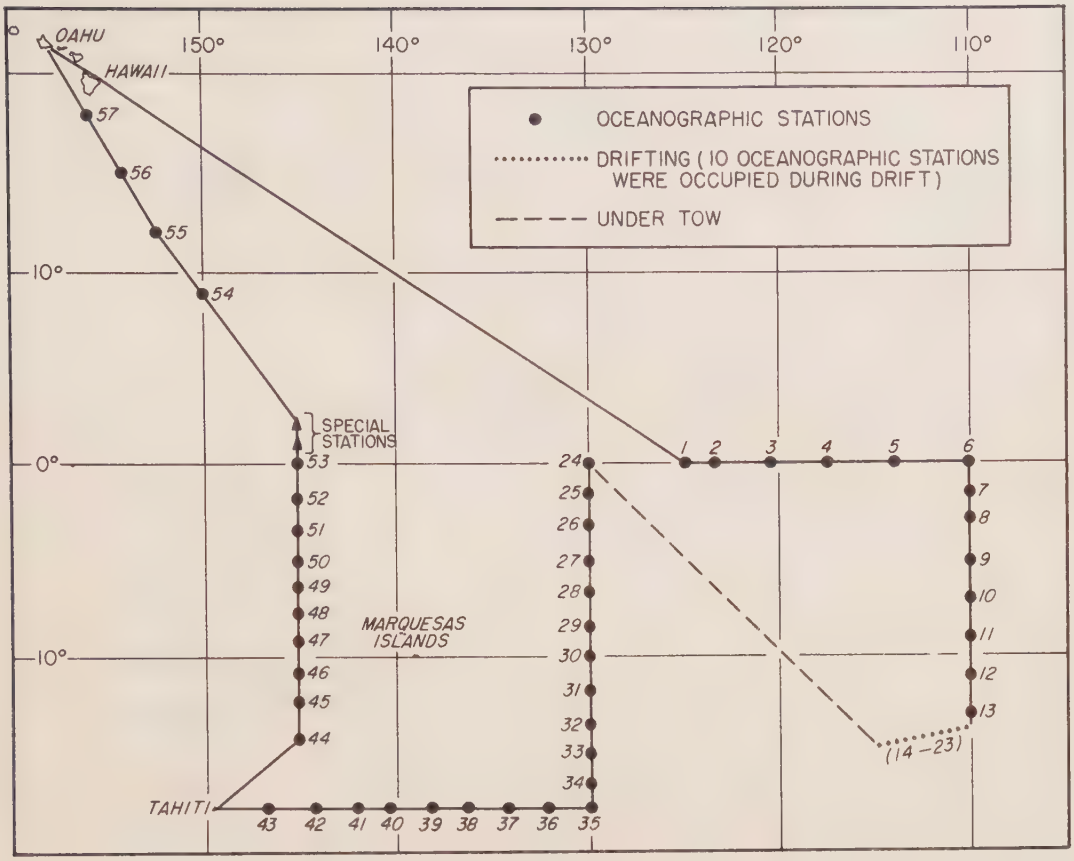


Figure 1.--Oceanographic stations occupied during Hugh M. Smith cruise 38.

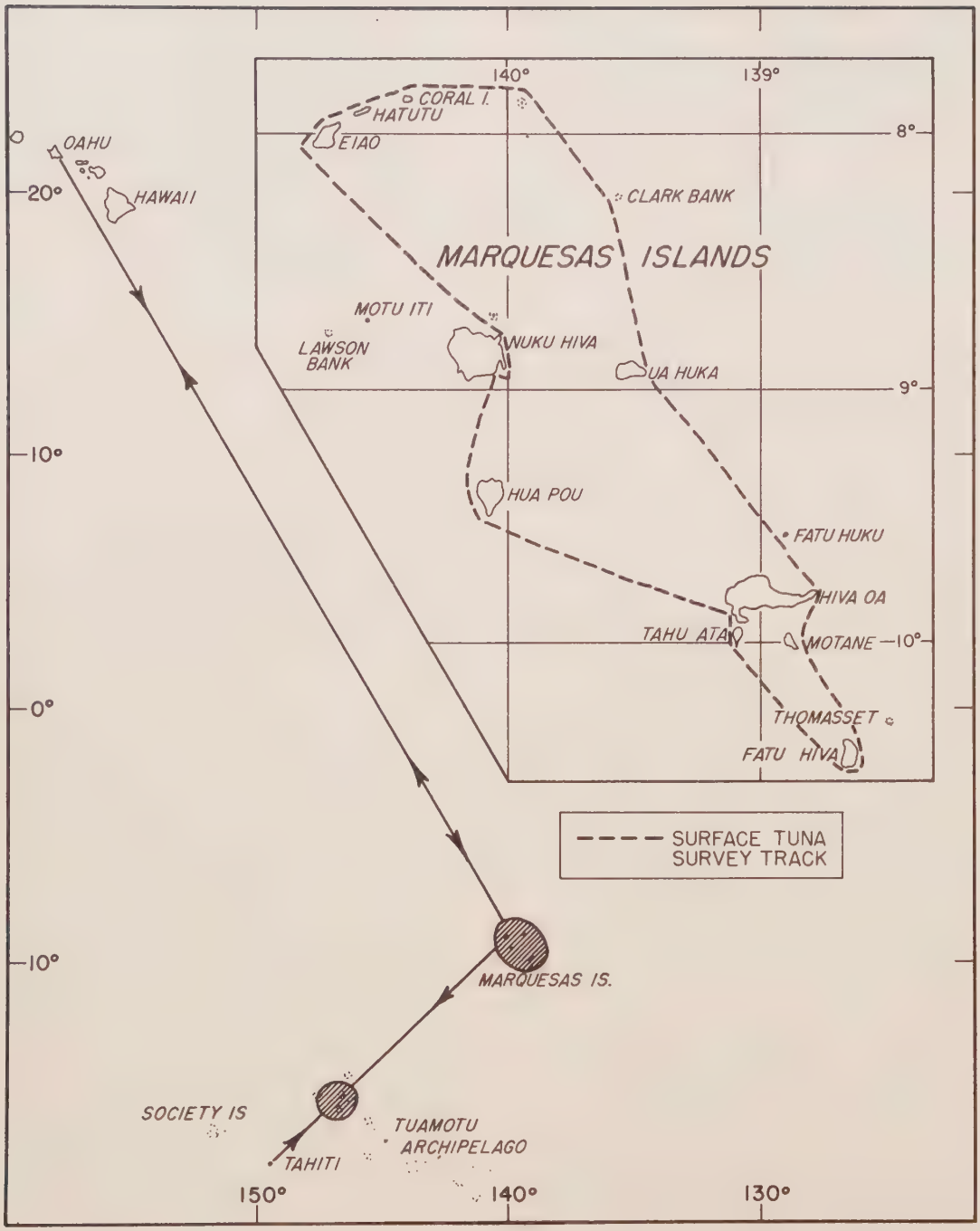


Figure 2.--Charles H. Gilbert cruise 32 to the Marquesas and Tuamotu islands.

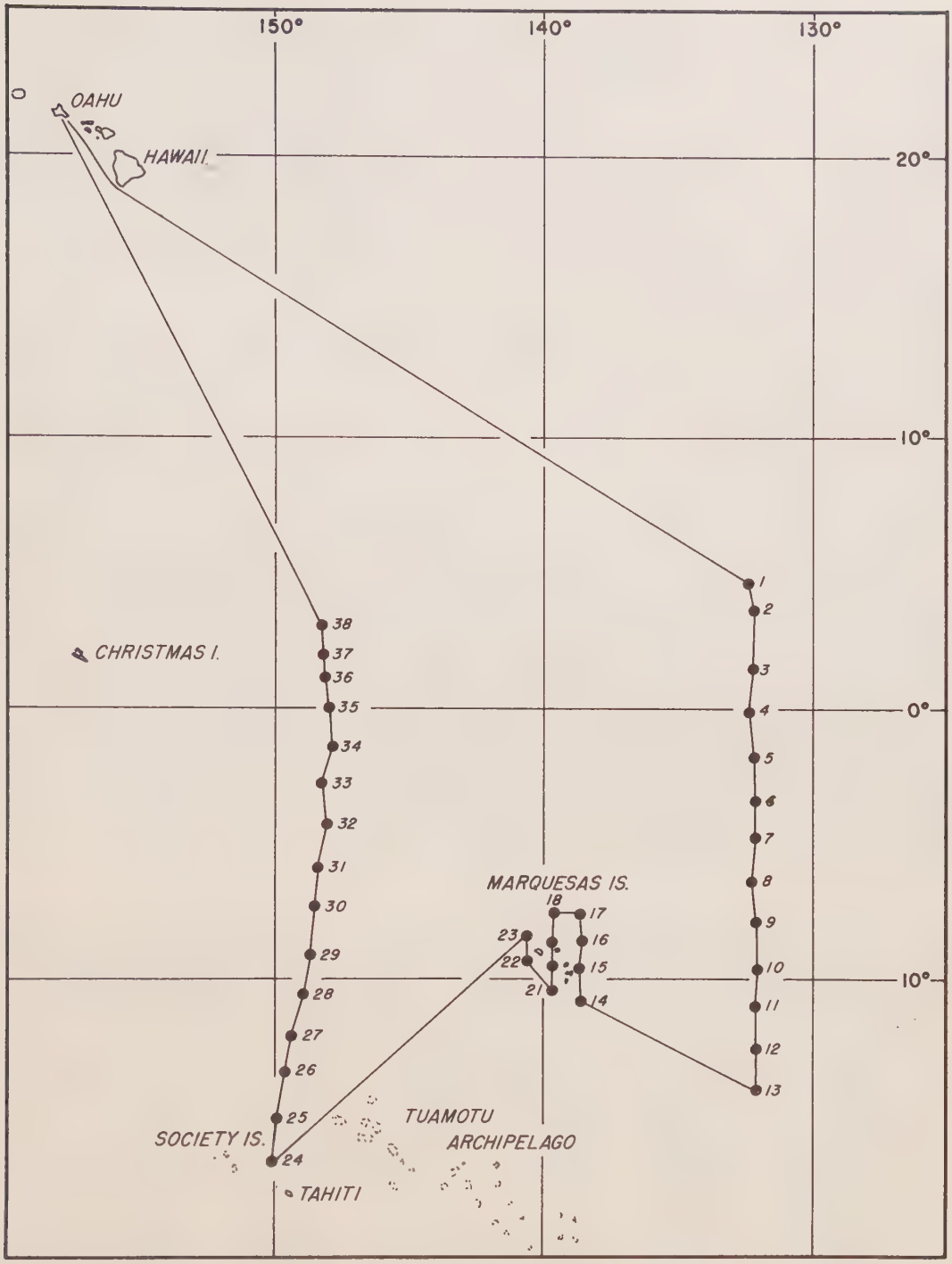


Figure 3.--Longline station positions, John R. Manning cruise 34.

Table 1.--Station curves and observed oceanographic data, Hugh M. Smith cruise 38

NOTES ON OCEANOGRAPHIC STATION CURVES

Thermosteric anomaly (oblique lines) are in centiliters per ton (see Mongtomgery 1954). Where temperatures of paired thermometers differed by more than 0.05°C. below 300 m. or more than 0.10°C. above 300 m., both values are plotted and designated by the symbol ⩓. The other variables are plotted for each of the temperature values, see station O-1. When the station curve is not drawn through a plotted value, it is considered a gross error and not used.

Explanatory code for station curves

- ⩓ Reversing thermometer temperatures °C.
- · BT temperature °C.
- ⊡ Salinity ‰
- ▽ Dissolved oxygen ml./L.
- ⊙ Inorganic phosphate μg at./L.

NOTES ON OBSERVED OCEANOGRAPHIC DATA

Where more than one cast was made on a station, they are separated by a horizontal line. The cast number is indicated by a Roman numeral in the margin.

Where the corrected, paired, protected thermometer readings differed by more than 0.05°C. below 300 m. or more than 0.10°C. above 300 m., both temperature values are tabulated and the depth and salinity are repeated. Delta-t calculated using each temperature value is carried.

The following oceanographic stations were pretrips. Surface temperature and salinity for these stations will be found in table 2.

Station No.	Latitude	Longitude	PO_4, μg at./L.	BT No.
38	17°40.0'S	136°16.0'W	0.29	193
39	17°31.0'S	138°10.0'W	0.29	197
52	01°46.0'S	144°53.6'W	NG	241

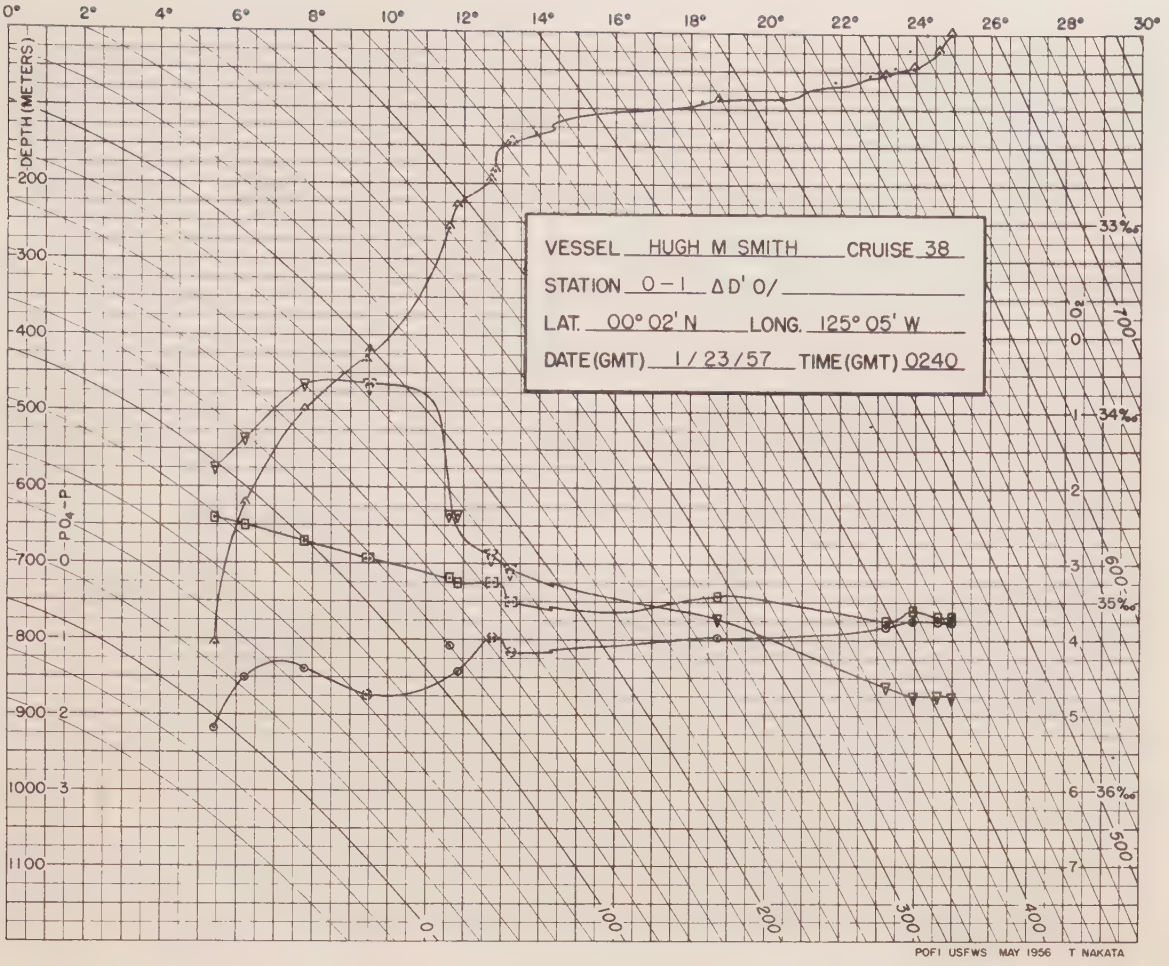
Wind velocity was measured with an anemometer 30 meters above the sea surface. The direction (given to the nearest 10°) is that from which the wind was blowing, measured through 360° from north.

Oxygen samples on station O-25 were improperly labeled in the field and have been arranged according to the station curves on either side of the station. Oxygen samples were not taken while the vessel was drifting (stations O-14 through O-23).

Phosphate values on stations O-14 through O-23 were deleted as examination indicated they were erroneous. Stations O-46, O-47, and O-49 appeared questionable but were retained for information.

Explanatory code for tabulated data

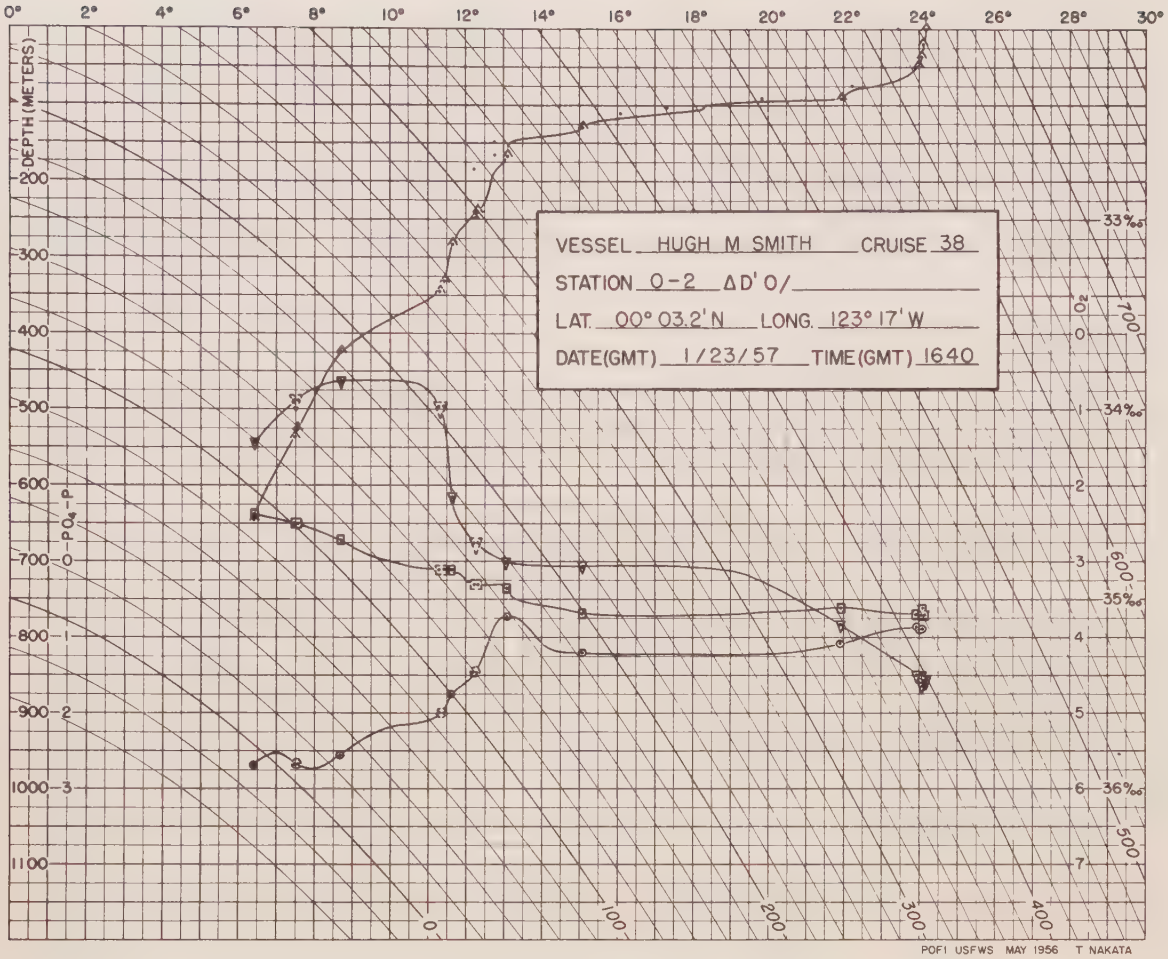
- NG - The value or line is in error and is discarded.
- NS - This water sample was lost.
- PT - Nansen bottle pretripped and data are unusable.
- Q - The value seems questionable but was used in construction of the station curve.
- P - The value is questionable and while carried was not used in drawing the station curve.


VESSEL HUGH M SMITH CRUISE 38
STATION 0-1 ΔD' 0/
LAT. 00° 02' N LONG. 125° 05' W
DATE (GMT) 1/23/57 TIME (GMT) 0240
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather 02, cloud coverage 1. Wind: 090°, 10 kt. Sea: 1-3 ft. Wire angle: 17°.
BT slide: 41. Dry bulb: 76.7°F. Wet bulb: 71.9°F. Barometric pressure: 1010 mb.

Depth, m. 1/	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.97	35.07	447.0	4.76	0.75
21	24.62	35.08	436.2	4.74	0.74
43	23.95	35.05	419.1	4.74	0.74
54	23.21	35.10	394.8	4.61	0.81
89	18.74	34.97	289.1	3.72	0.98
148	13.22	35.01	166.0	3.04	1.18
148	13.33	35.01	168.2	-	-
230	11.80	34.90	147.7	2.34 P	1.44
195	12.70	34.90	164.2	2.90	0.98
184	12.81	34.90	166.3	-	-
259	11.62	34.88	146.2	2.36	1.10 P
433	9.42	34.78	116.7	0.63	1.73
421	9.51	34.78	118.2	-	-
500	7.80	34.69	99.2	0.65	1.39
622	6.24	34.60	85.2	1.37	1.52
808	5.42	34.56	78.4	1.73	2.19

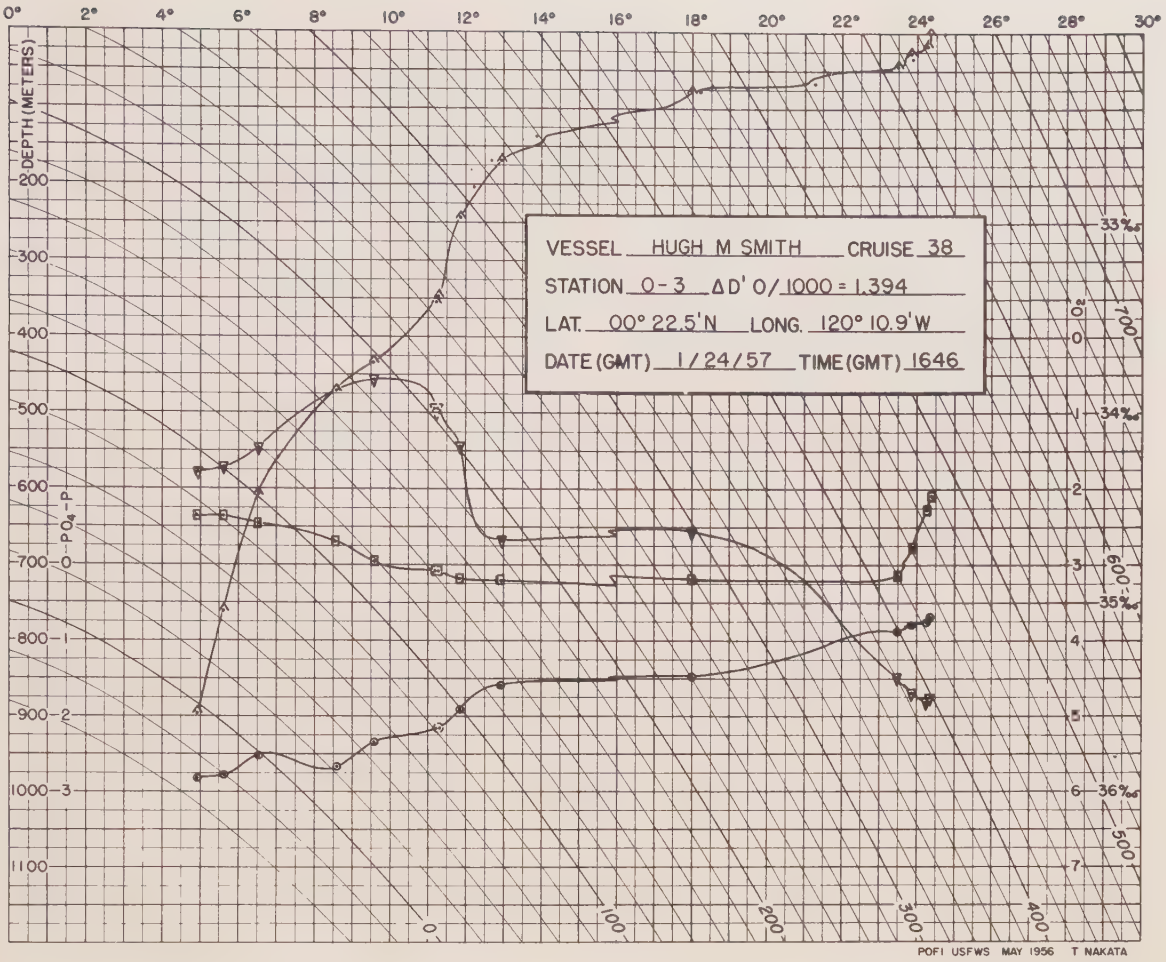
1/ Depths unreliable; too many pretrips


VESSEL HUGH M SMITH CRUISE 38
STATION O-2 ΔD' O/
LAT. 00° 03.2' N LONG. 123° 17' W
DATE(GMT) 1/23/57 TIME(GMT) 1640
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 3. Wind: 090°, 12 kt. Sea: 1-3 ft. Wire angle: 25°.
BT slide: 45. Dry bulb: 76.0°F. Wet bulb: 72.1°F. Barometric pressure: 1012 mb.

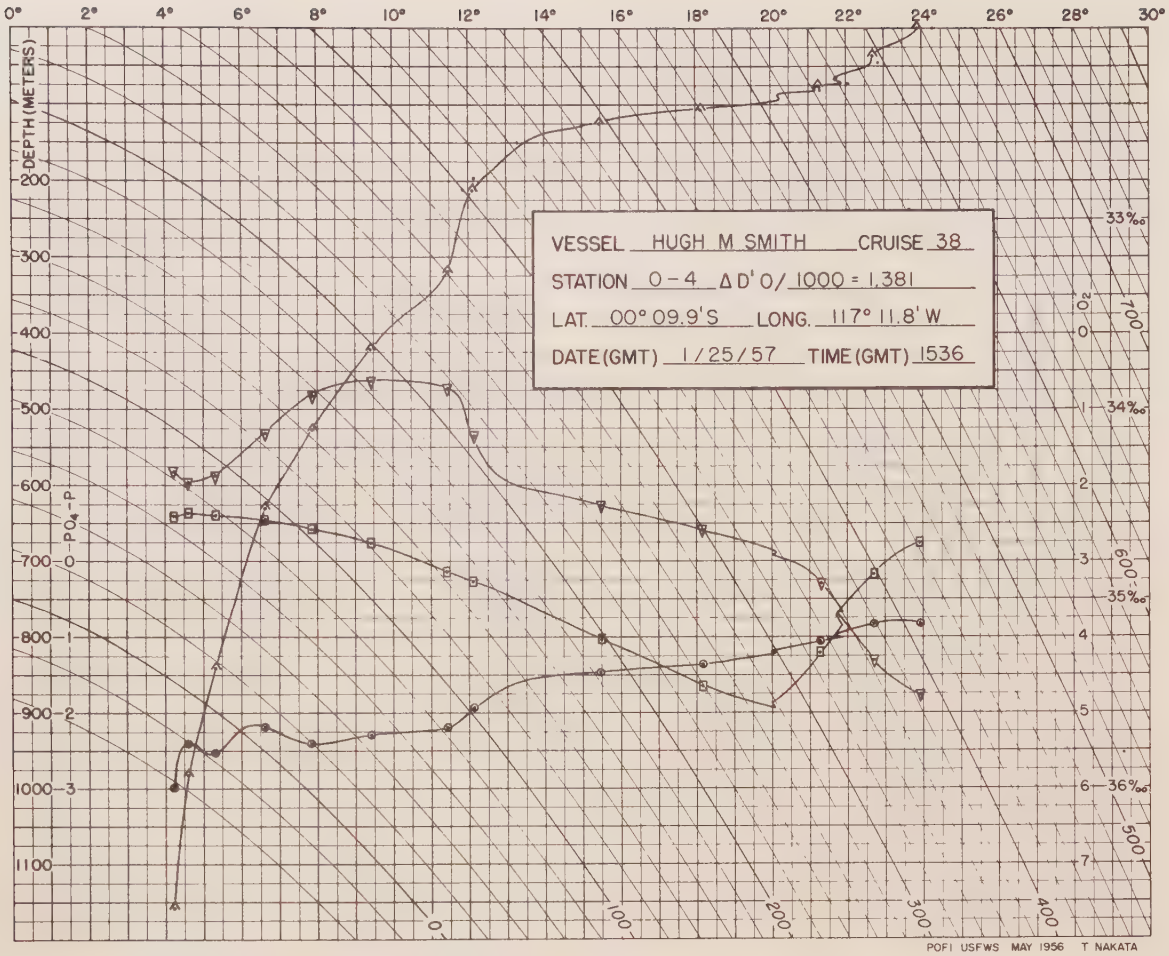
Depth, m. 1/	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.19	35.07	424.5	4.58	NG
18	24.12	35.05	424.1	4.63	0.90
35	24.07	35.08	420.5	4.52	0.89
48	23.97	35.08	417.8	4.50	0.87
90	21.93	35.05	363.8	3.82	1.07
129	15.09	35.07	199.2	3.05	1.20
167	13.10	34.94	168.8	3.00	0.71
249	12.23	34.92	154.2	2.75	1.47
240	12.31	34.92	155.4	-	-
282	11.65	34.85	148.8	2.15	1.73
345	11.31	34.85	142.8	0.98	2.00
331	11.42	34.85	144.7	-	-
427	8.70	34.69	112.3	0.63	2.53
527	7.58	34.61	101.9	0.89	2.67
538	7.50	34.61	100.8	-	-
644	6.41	34.56	90.4	1.43	2.68

1/ Depths unreliable; too many pretrips


VESSEL HUGH M SMITH CRUISE 38
STATION 0-3 ΔD' 0/1000 = 1.394
LAT. 00° 22.5'N LONG. 120° 10.9'W
DATE (GMT) 1/24/57 TIME (GMT) 1646
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

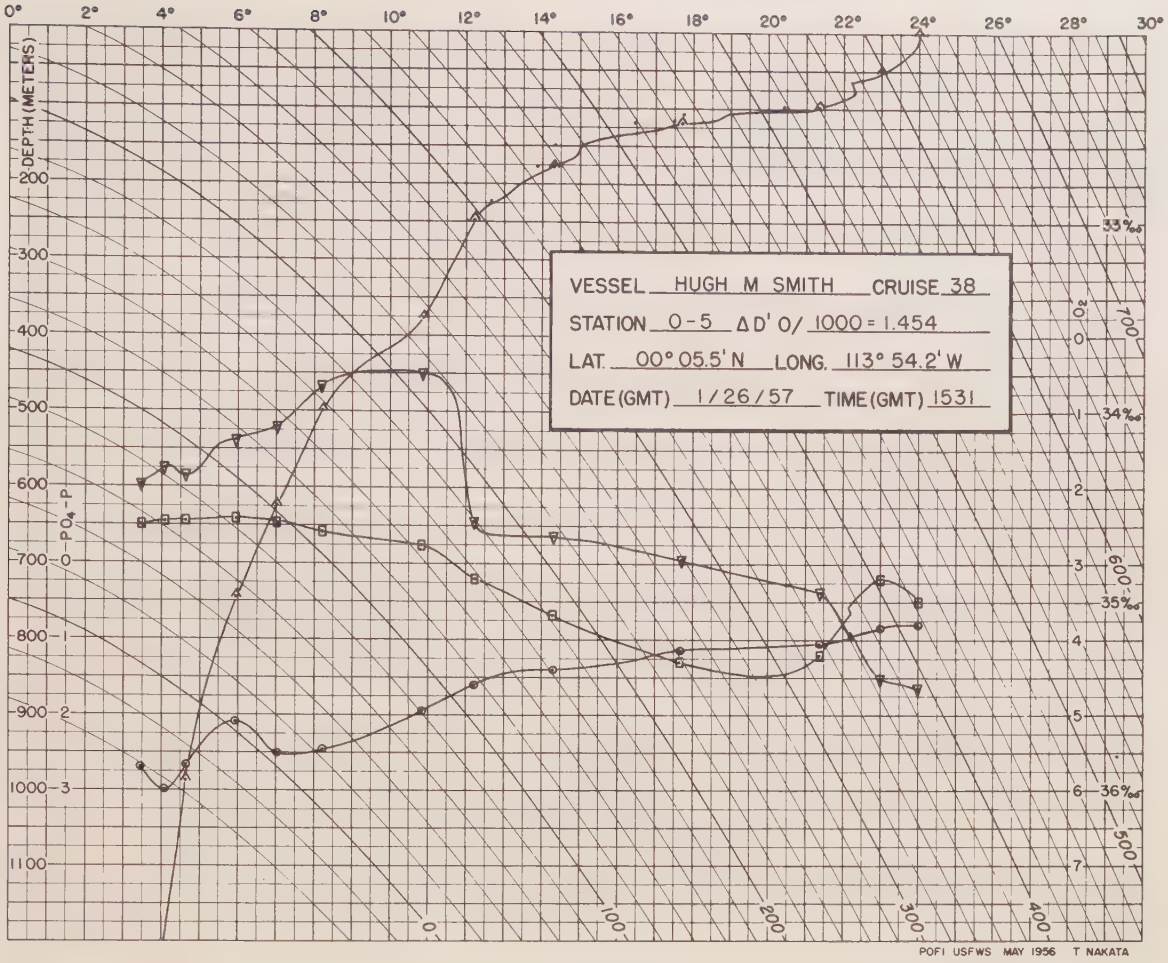
Weather: 02, cloud coverage 2. Wind: 140°, 14 kt. Sea: 3-5 ft. Wire angle: 35°.
BT slide: 53. Dry bulb: 77.6°F. Wet bulb: 72.9°F. Barometric pressure: 1013 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.38	34.43	476.0	4.74	0.68
16	24.28	34.51	467.5	4.80	0.74
27	23.88	34.70	442.3	4.69	0.79
46	23.48	34.85	420.4	4.49	0.87
77	18.00	34.87	278.5	2.55	1.46
169	12.94	34.88	170.2	2.66	1.60
252	11.79	34.87	149.8	1.43	1.91
354	11.22	34.83	142.7	0.95	2.18
349	11.27	34.83	143.5	-	-
433	9.58	34.78	119.0	0.54	2.34
465	8.65	34.67	113.0	0.70	2.67
607	6.55	34.58	90.5	1.48	2.52
761	5.61	34.54	82.3	1.71	2.79
897	4.92	34.54	74.3	1.79	2.81


VESSEL HUGH M SMITH CRUISE 38
STATION 0-4 ΔD' O/ 1000 = 1.381
LAT. 00° 09.9'S LONG. 117° 11.8' W
DATE (GMT) 1/25/57 TIME (GMT) 1536
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

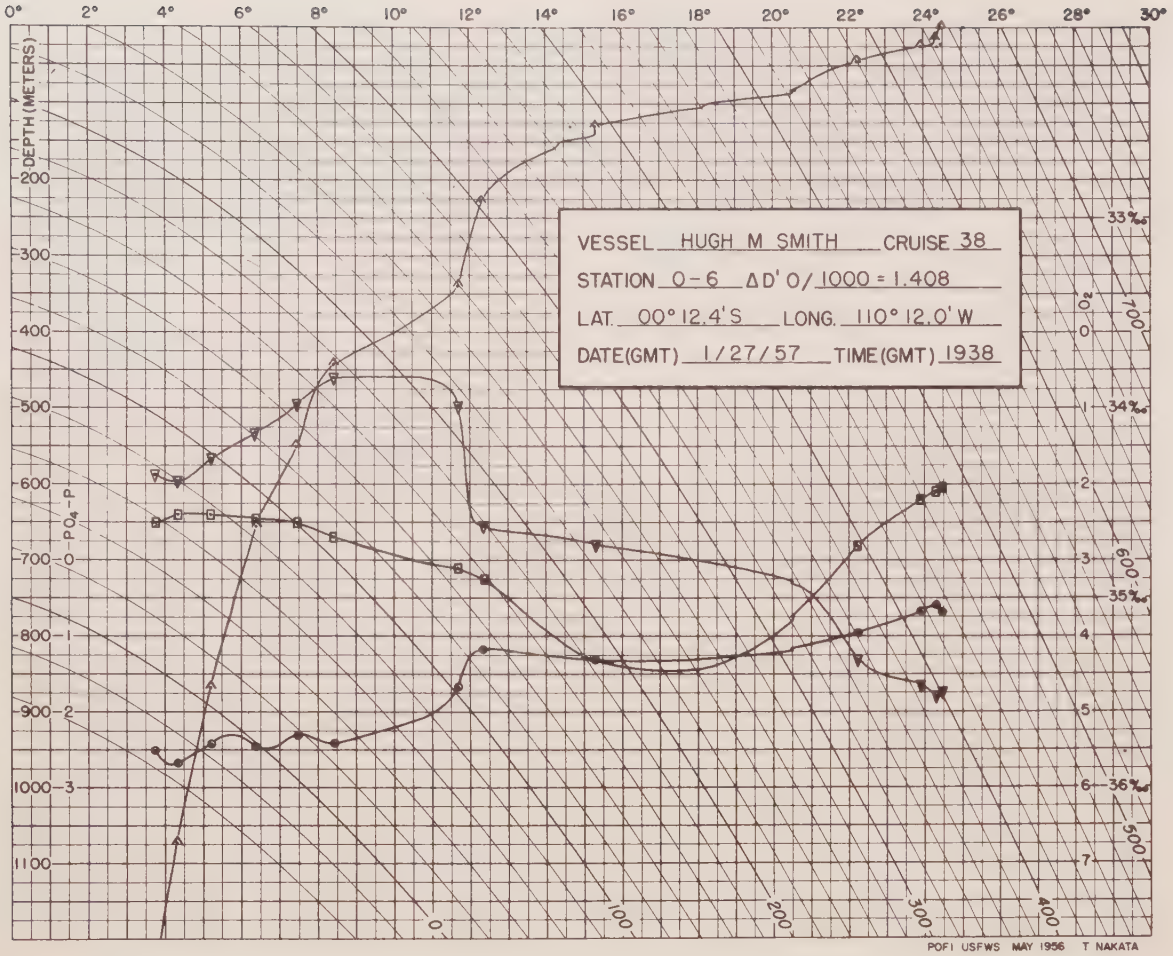
Weather: 03, cloud coverage 7. Wind: 150°, 11 kt. Sea: 1-3 ft. Wire angle: 20°.
BT slide: 61. Dry bulb: 75.5°F. Wet bulb: 72.1°F. Barometric pressure: 1013 mb.

Depth, m.	^{o}T, ^{o}C.	^{o}S, ^{o}/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.92	34.70	443.5	4.74	0.82
35	22.70	34.87	397.5	4.30	0.82
75	21.29	35.28	330.5	3.29	1.06
106	18.19	35.46	240.1	2.58	1.34
123	15.44	35.21	196.5	2.25	1.46
212	12.12	34.90	153.3	1.35	1.93
318	11.42	34.85	144.8	0.72	2.19
421	9.42	34.70	122.5	0.61	2.28
527	7.86	34.63	104.3	0.81	2.40
630	6.62	34.58	91.6	1.31	2.18
840	5.32	34.56	77.3	1.86	2.52
982	4.60	34.54	70.9	1.96	2.40
1157	4.23	34.56	65.7	1.81	2.99


VESSEL HUGH M SMITH CRUISE 38
STATION 0-5 ΔD' O/ 1000 = 1.454
LAT. 00° 05.5' N LONG. 113° 54.2' W
DATE (GMT) 1/26/57 TIME (GMT) 1531
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

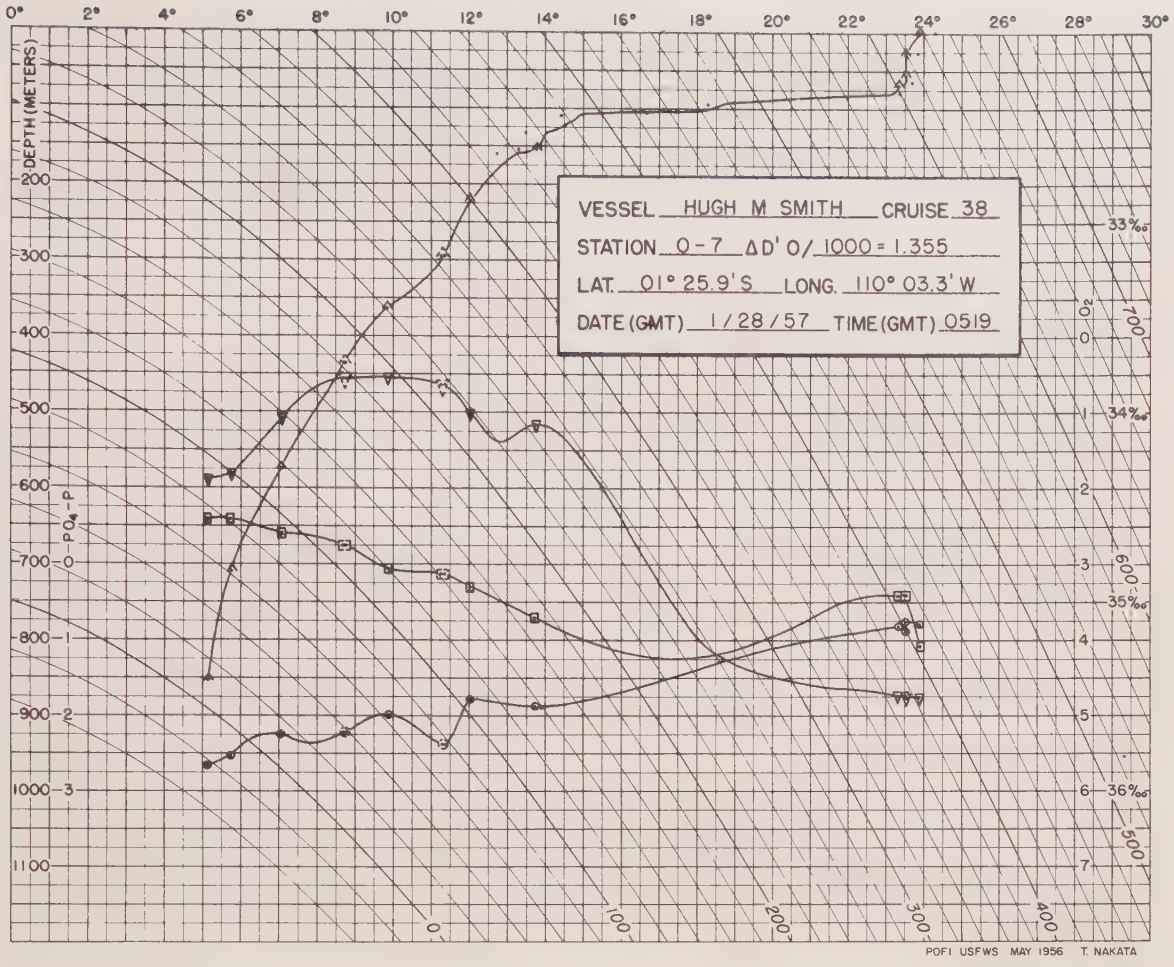
Weather: 01, cloud coverage 4. Wind: 150°, 14 kt. Sea: 1-3 ft. Wire angle: 19°.
BT slide: 70. Dry bulb: 77.3°F. Wet bulb: 72.7°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	24.01	34.99	425.4	4.64	0.80
52	23.02	34.88	405.4	4.52	0.83
98	21.39	35.28	333.1	3.36	1.06
119	17.70	35.32	238.9	2.93	1.14
177	14.32	35.07	183.3	2.64	1.40
249	12.23	34.88	157.0	2.45	1.61
376	10.90	34.78	140.7	0.50	1.94
497	8.22	34.63	109.7	0.65	2.47
623	7.02	34.58	96.7	1.20	2.51
744	5.94	34.56	84.6	1.36	2.10
987	4.64	34.58	68.3	1.84	2.67
1216	4.10	34.58	62.7	1.75	3.00
1432	3.48	34.60	55.4	1.96	2.70


VESSEL HUGH M SMITH CRUISE 38
STATION 0-6 ΔD' O/1000 = 1.408
LAT. 00° 12.4' S LONG. 110° 12.0' W
DATE(GMT) 1/27/57 TIME(GMT) 1938
DEPTH (METERS)
POFI USFWS MAY 1956 T NAKATA

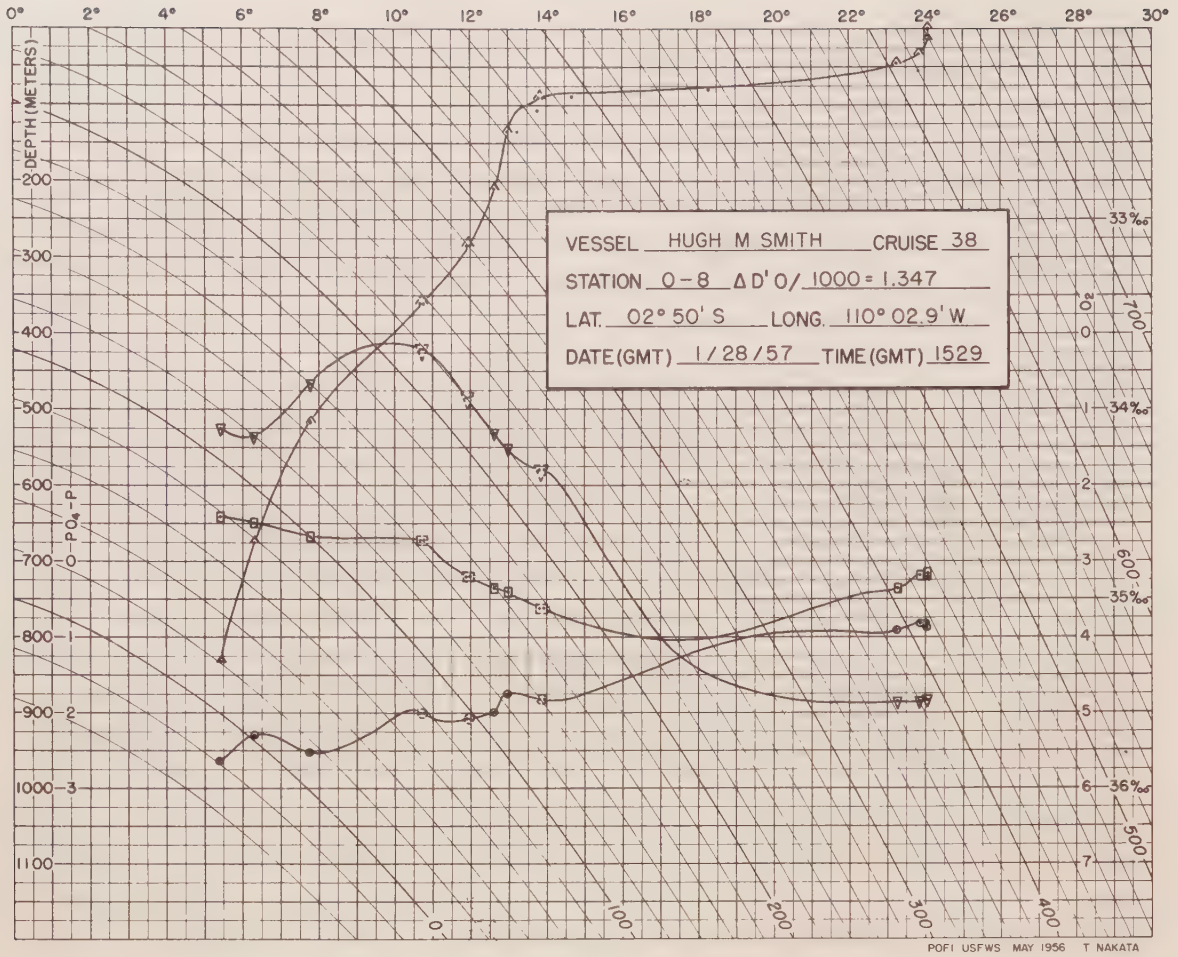
Weather: 01, cloud coverage 1. Wind: 100°, 11 kt. Sea: 1-3 ft. Wire angle: 24°.
BT slide: 80. Dry bulb: 76.8°F. Wet bulb: 72.4°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.47	34.42	479.3	4.75	0.68
14	24.32	34.43	474.3	4.80	0.59
24	23.90	34.47	459.5	4.66	0.68
43	22.24	34.72	396.0	4.31	0.94
130	15.32	35.32	185.8	2.78	1.29
229	12.34	34.90	157.6	2.54	1.17
340	11.67	34.85	149.1	0.95	1.68
443	8.43	34.67	109.8	0.60	2.40
551	7.46	34.61	100.3	0.93	2.30
656	6.40	34.58	88.7	1.32	2.45
868	5.20	34.56	75.9	1.68	2.40
1072	4.34	34.56	66.7	1.96	2.65
1270	3.76	34.61	57.3	1.89	2.52


VESSEL HUGH M SMITH CRUISE 38
STATION 0-7 ΔD' O/1000 = 1.355
LAT. 01° 25.9' S LONG. 110° 03.3' W
DATE (GMT) 1/28/57 TIME (GMT) 0519
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

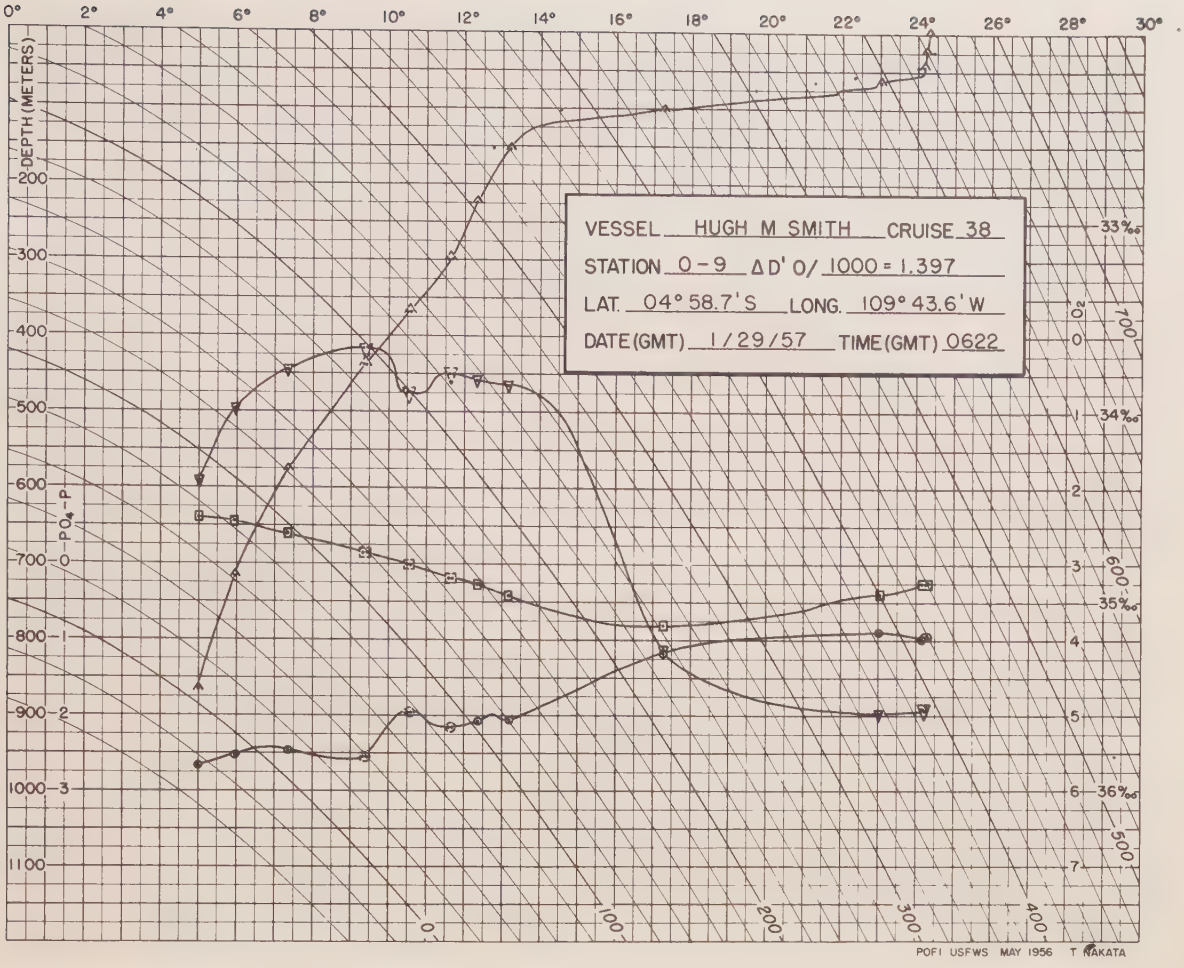
Weather: 02, cloud coverage 8. Wind: 180°, 10 kt. Sea: 1-3 ft. Wire angle: 05°.
BT slide: 82. Dry bulb: 76.3°F. Wet bulb: 72.9°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.90	35.23	404.7	4.76	0.79
27	23.54	34.96	414.2	4.73	0.76
55	23.56	34.97	414.0	4.74	0.88
70	23.37	34.97	408.5	4.73	0.82
NG	-	-	-	-	-
153	13.78	35.08	171.8	1.16	1.87
223	12.03	34.92	150.5	1.04	1.79
296	11.27	34.85	142.1	0.66	2.39
296	11.35	34.85	143.6	-	-
364	9.88	34.83	120.0	0.54	1.99
435	8.71	34.70	111.6	0.56	2.22
435	8.77	34.70	112.3	-	-
573	7.06	34.63	93.4	1.07	2.24
710	5.76	34.56	82.3	1.80	2.52
852	5.16	34.56	75.5	1.87	2.65


VESSEL HUGH M SMITH CRUISE 38
STATION 0-8 ΔD'O/1000 = 1.347
LAT. 02° 50' S LONG. 110° 02.9' W
DATE (GMT) 1/28/57 TIME (GMT) 1529
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 3. Wind: 160°, 15 kt. Sea: 3-5 ft. Wire angle: < 05°.
BT slide: 85. Dry bulb: 76.1°F. Wet bulb: 72.8°F. Barometric pressure: 1012 mb.

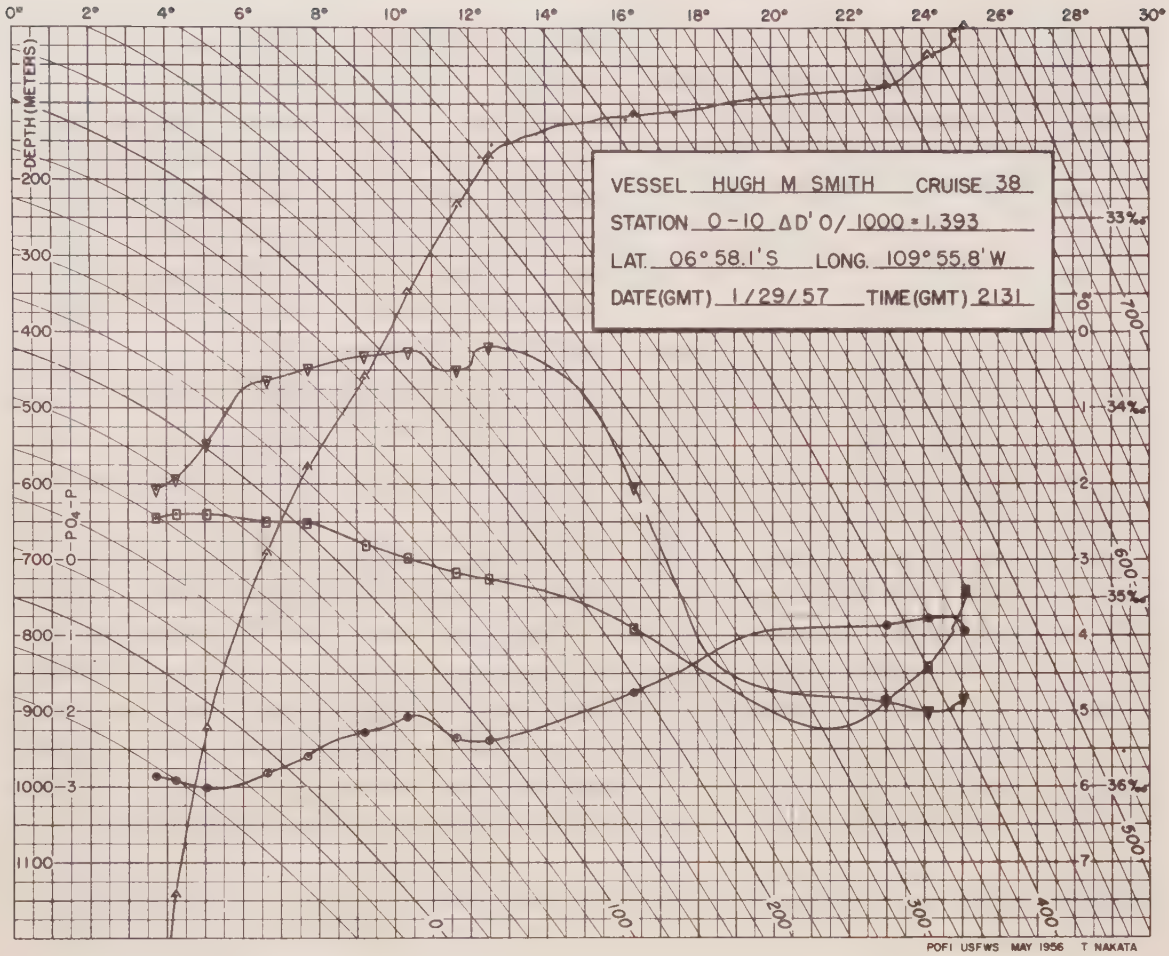
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.09	34.87	436.0	4.84	0.88
16	24.06	34.88	434.6	4.84	0.82
33	23.89	34.88	429.7	4.85	0.82
46	23.28	34.94	408.3	4.85	0.90
PT	-	-	-	-	-
90	13.82	35.05	174.8	1.77	1.82
90	13.92	35.05	176.7	-	-
133	12.98	34.96	165.2	1.52	1.75
208	12.62	34.94	159.7	1.32	2.00
284	11.90	34.88	150.9	0.83	2.09
284	11.96	34.88	152.0	-	-
360	10.69	34.69	143.7	0.20	2.00
360	10.79	34.69	145.4	-	-
517	7.78	34.67	100.4	0.64	2.51
675	6.34	34.60	86.4	1.33	2.29
833	5.42	34.56	78.4	1.25	2.65


VESSEL HUGH M SMITH CRUISE 38
STATION 0-9 ΔD' O/ 1000 = 1.397
LAT. 04° 58.7' S LONG. 109° 43.6' W
DATE (GMT) 1/29/57 TIME (GMT) 0622
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 2. Wind: 150°, 15 kt. Sea: 3-5 ft. Wire angle: 10°.
BT slide: 90. Dry bulb: 75.7°F. Wet bulb: 72.4°F. Barometric pressure: 1012 mb.

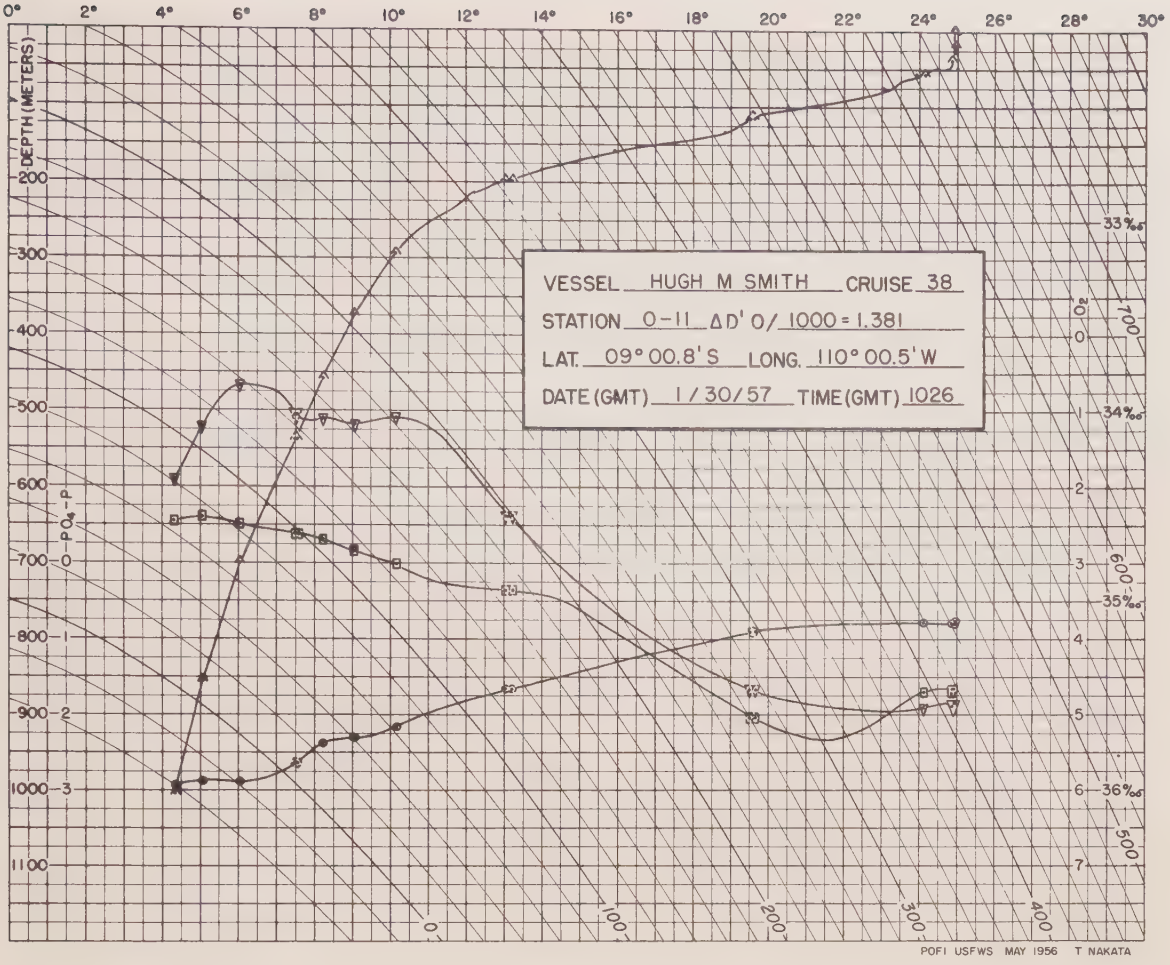
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.32	34.90	440.5	4.89	0.94
23	24.26	34.90	438.8	4.94	0.94
42	24.18	34.90	436.5	4.92	1.00
64	23.03	34.96	400.0	4.97	0.88
102*	17.27	35.12	243.3	4.14	1.19
153*	13.18	34.97	168.2	0.64	2.05
226*	12.35	34.90	157.7	0.58	2.09
300*	11.60	34.87	146.5	0.50	2.16
300*	11.68	34.87	147.7	-	-
369*	10.52	34.81	132.1	0.74	1.98
369*	10.58	34.81	133.2	-	-
439*	9.36	34.74	118.7	0.17	2.53
439*	9.41	34.74	119.5	-	-
577	7.38	34.65	96.3	0.46	2.46
717	5.94	34.58	83.0	0.97	2.52
865	5.00	34.56	73.6	1.92	2.65

* Depths questionable


VESSEL HUGH M SMITH CRUISE 38
STATION 0-10 ΔD' O/ 1000 = 1.393
LAT. 06° 58.1' S LONG. 109° 55.8' W
DATE(GMT) 1/29/57 TIME(GMT) 2131
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 3. Wind: 120°, 12 kt. Sea: 3-5 ft. Wire angle: 24°.
BT slide: 95. Dry bulb: 76.9°F. Wet bulb: 72.0°F. Barometric pressure: 1011 mb.

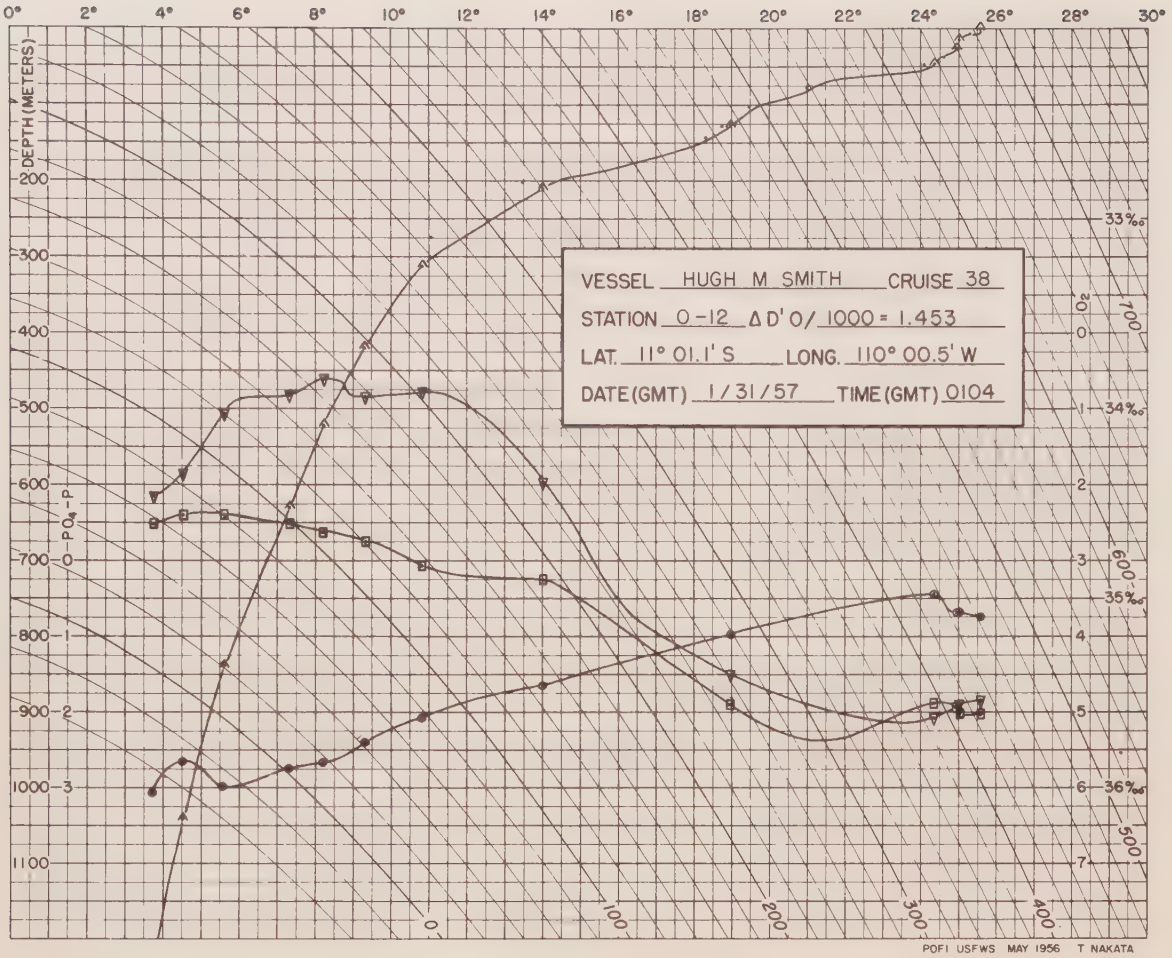
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	25.13	34.97	458.8	4.84	0.94
39	24.16	35.37	402.2	5.01	0.79
78	23.01	35.55	356.9	4.87	0.86
116	16.33	35.16	219.7	2.05	1.75
170	12.51	34.90	160.8	0.19	2.39
233	11.66	34.87	147.4	0.50	2.35
350	10.36	34.78	131.5	0.25	2.09
462	9.22	34.72	117.9	0.31	2.27
579	7.72	34.61	104.0	0.48	2.58
692	6.64	34.60	90.3	0.63	2.81
923	5.08	34.56	74.4	1.49	3.02
1144	4.26	34.56	65.9	1.94	2.91
1358	3.72	34.58	59.2	2.08	2.84


VESSEL HUGH M SMITH CRUISE 38
STATION 0-11 ΔD' O/ 1000 = 1.381
LAT. 09° 00.8' S LONG. 110° 00.5' W
DATE (GMT) 1/30/57 TIME (GMT) 1026
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 1. Wind: 150°, 10 kt. Sea: 1-3 ft. Wire angle: 04°.
BT slide: 99. Dry bulb: 75.4°F. Wet bulb: 70.5°F. Barometric pressure: 1011 mb.

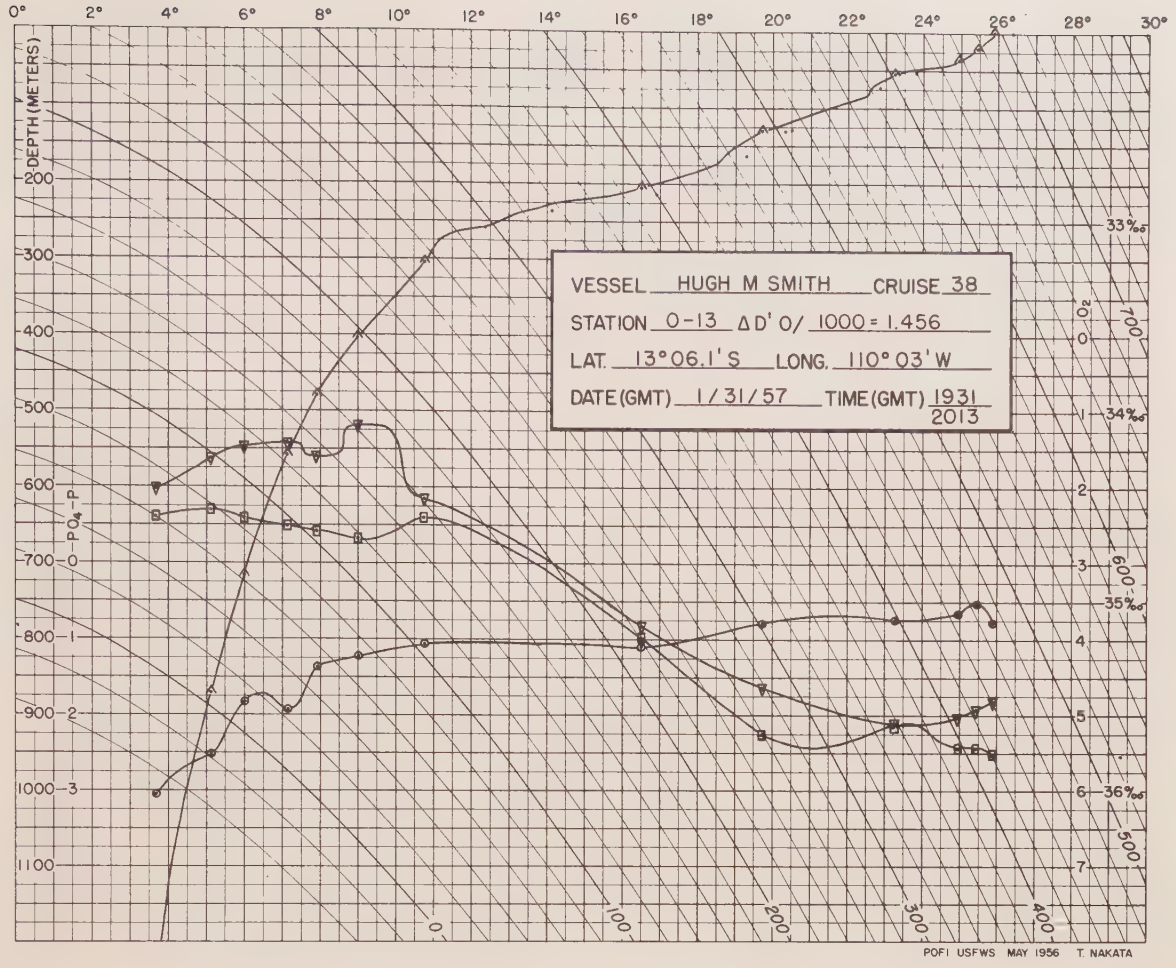
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.92	35.46	417.4	4.84	0.79
17	24.96	35.46	418.8	4.85	0.76
38	24.89	35.48	415.0	4.87	0.79
55	24.16	35.48	394.3	4.90	0.79
114*	19.53	35.62	261.0	4.67	0.90
114*	19.64	35.62	264.0	-	-
199*	13.05	34.94	168.0	2.38	1.68
199*	13.21	34.94	171.0	-	-
294*	10.17	34.81	126.2	1.08	2.18
374	9.05	34.74	113.8	1.18	2.31
457	8.22	34.67	106.7	1.10	2.38
537	7.50	34.65	97.9	1.05	2.65
537	7.55	34.65	98.6	-	-
700	6.06	34.60	82.8	0.66	2.89
855	5.08	34.56	74.4	1.21	2.89
1005	4.36	34.58	65.4	1.89	2.93

* Depths questionable


VESSEL HUGH M SMITH CRUISE 38
STATION 0-12 ΔD' O/ 1000 = 1.453
LAT. 11° 01.1' S LONG. 110° 00.5' W
DATE (GMT) 1/31/57 TIME (GMT) 0104
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

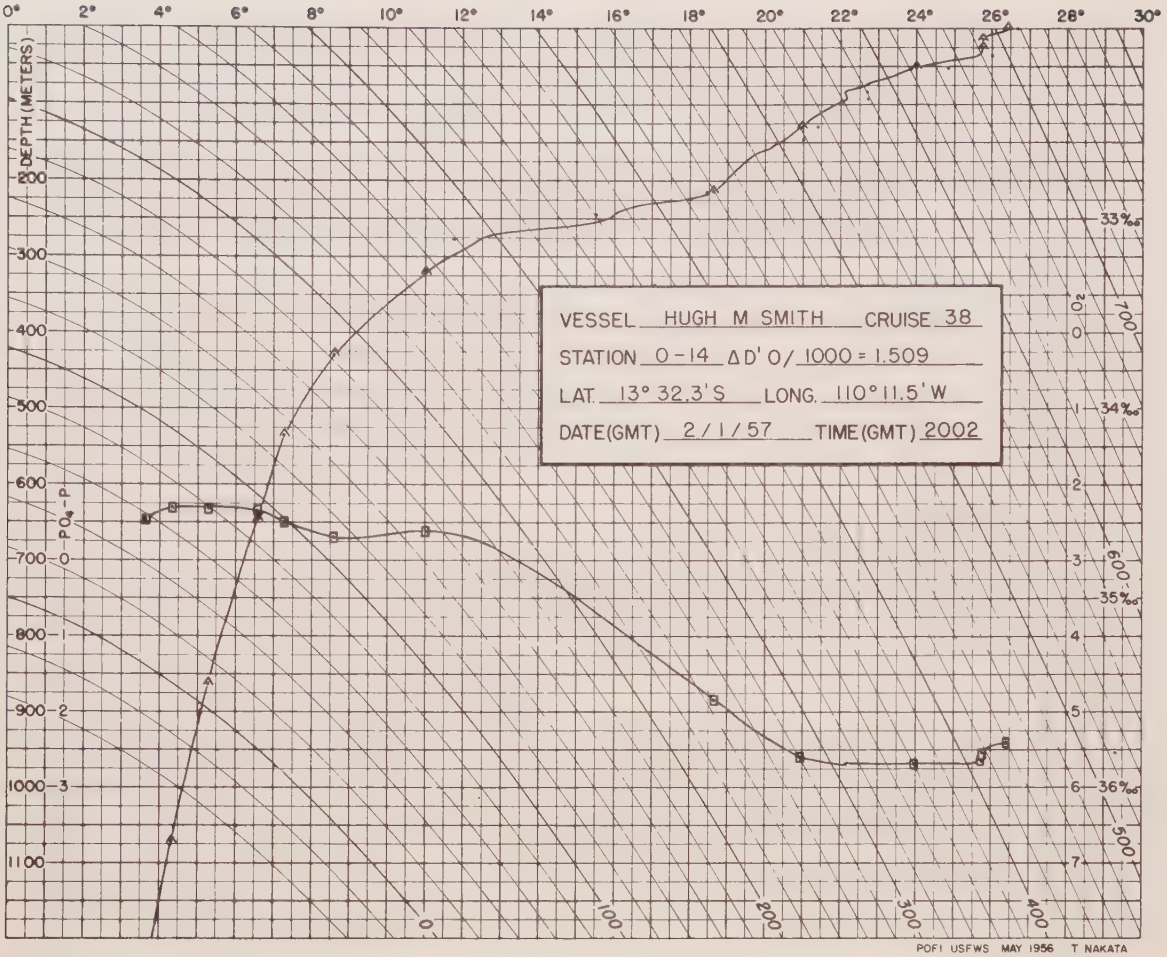
Weather: 02, cloud coverage 1. Wind: 140°, 04 kt. Sea: 1-3 ft. Wire angle: 14°.
BT slide: 104. Dry bulb: 78.2°F. Wet bulb: 71.2°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	25.60	35.61	426.7	4.84	0.72
15	25.04	35.61	410.5	4.90	0.68
26	24.92	35.57	409.5	4.92	0.68
46	24.38	35.55	395.3	5.07	0.43
128	18.98	35.53	254.3	4.50	0.97
210	14.03	34.90	190.3	1.96	1.64
312	10.82	34.83	135.8	0.76	2.09
420	9.32	34.70	120.8	0.82	2.40
522	8.22	34.65	108.2	0.60	2.65
629	7.32	34.61	98.5	0.80	2.73
838	5.60	34.56	80.6	1.05	2.99
1041	4.56	34.56	69.0	1.85	2.65
1249	3.76	34.61	57.3	2.14	3.09


VESSEL HUGH M SMITH CRUISE 38
STATION 0-13 ΔD' O/ 1000 = 1.456
LAT. 13°06.1' S LONG. 110°03' W
DATE (GMT) 1/31/57 TIME (GMT) 1931 2013
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

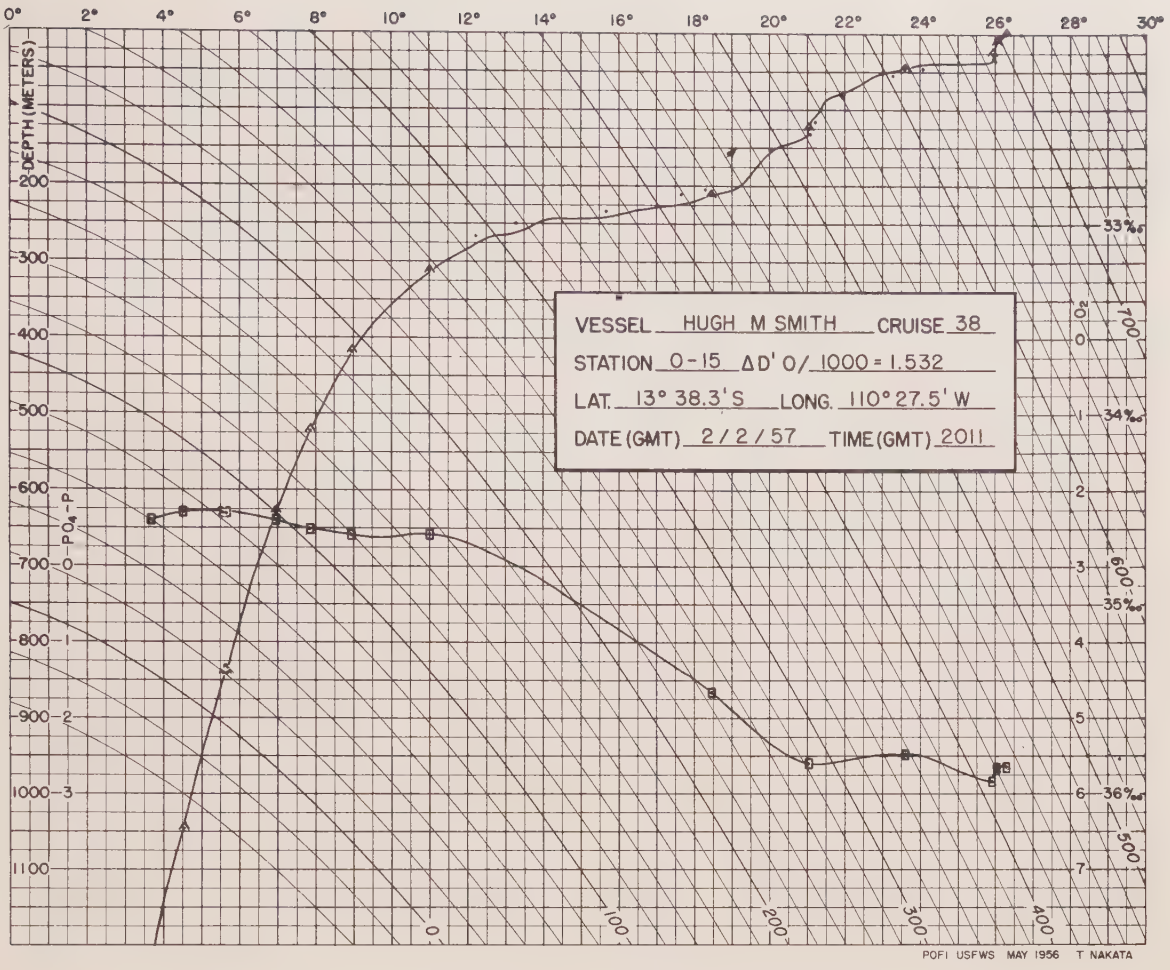
Weather: 02, cloud coverage 1. Wind: 140°, 03 kt. Sea: < 1 ft. Wire angle: 0°, 0°.
BT slide: 108. Dry bulb: 79.3°F. Wet bulb: 70.9°F. Barometric pressure: 1012 mb.

	Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
	0	25.89	35.81	421.0	4.79	0.76
	20	25.43	35.77	410.3	4.91	0.51
	35	24.96	35.77	396.3	5.02	0.64
	55	23.27	35.64	357.4	5.12	0.72
	130	19.72	35.70	259.8	4.63	0.79
	205	16.50	35.19	221.0	3.82	1.09
	305	10.78	34.56	154.8	2.16	1.06
	404	9.00	34.67	118.2	1.18	1.22
	479	7.91	34.63	105.1	1.59	1.37
	559	7.18	34.61	96.5	1.42	1.92
	716	6.00	34.56	85.1	1.47	1.83
I	872	5.14	34.52	78.3	1.62	2.52
II	1301	3.68	34.56	60.3	2.03	3.05


VESSEL HUGH M SMITH CRUISE 38
STATION 0-14 ΔD' O/ 1000 = 1.509
LAT. 13° 32.3' S LONG. 110° 11.5' W
DATE(GMT) 2/1/57 TIME(GMT) 2002
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

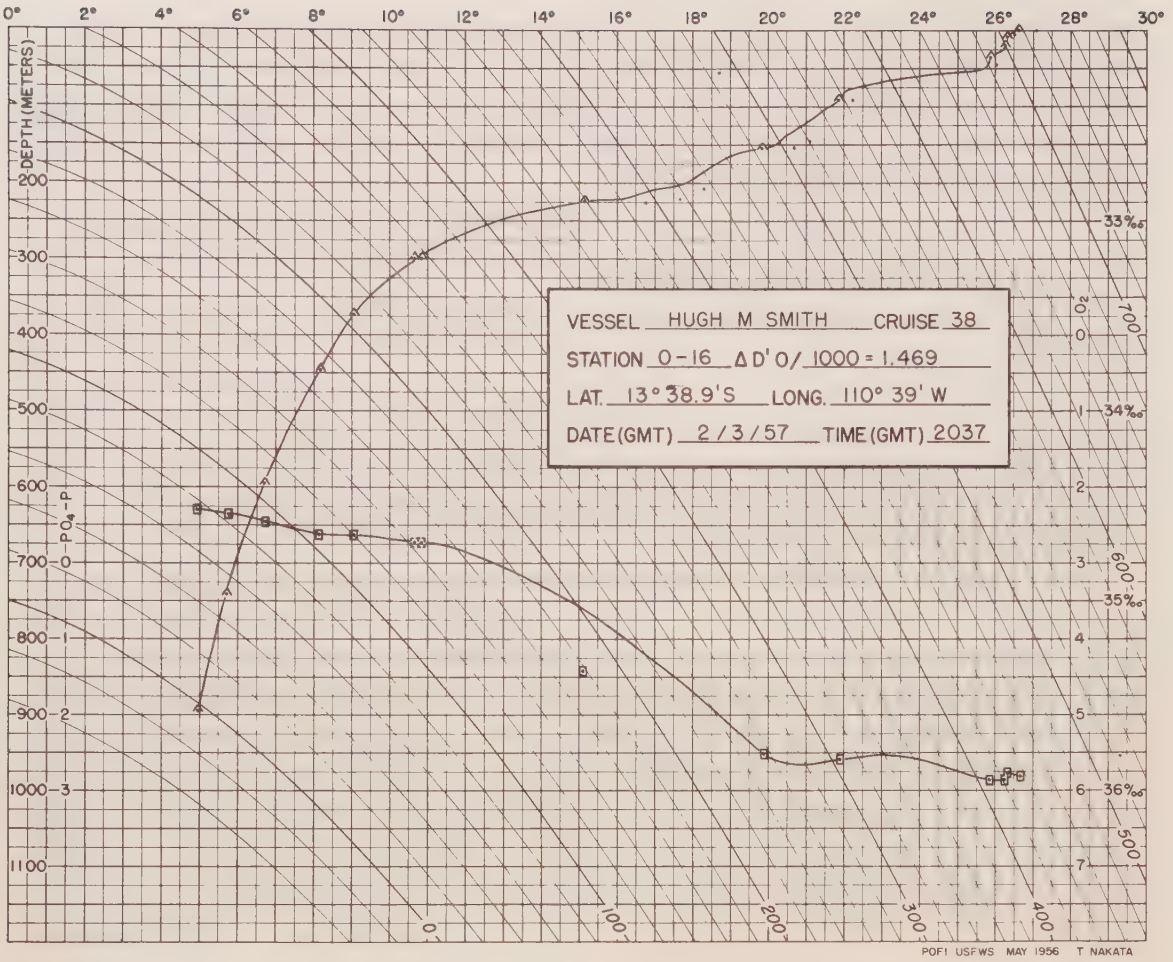
Weather: 02, cloud coverage 6. Wind: 080°, 08 kt. Sea: 1-3 ft. Wire angle: < 05°.
BT slide: 111. Dry bulb: 79.0°F. Wet bulb: 74.0°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.40	35.77	439.0	-	-
16	25.78	35.82	417.0	-	-
26	25.74	35.86	412.7	-	-
52	23.98	35.88	360.4	-	-
130	20.96	35.84	281.3	-	-
213	18.66	35.53	246.4	-	-
320	11.02	34.65	152.3	-	-
430	8.60	34.67	112.2	-	-
536	7.30	34.60	98:8	-	-
647	6.60	34.54	94.3	-	-
862	5.30	34.52	80.0	-	-
1070	4.33	34.52	69.7	-	-
1280	3.62	34.58	58.3	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-15 ΔD' O/ 1000 = 1.532
LAT. 13° 38.3' S LONG. 110° 27.5' W
DATE (GMT) 2/2/57 TIME (GMT) 2011
DEPTH (METERS)
POFI USFWS MAY 1956 T NAKATA

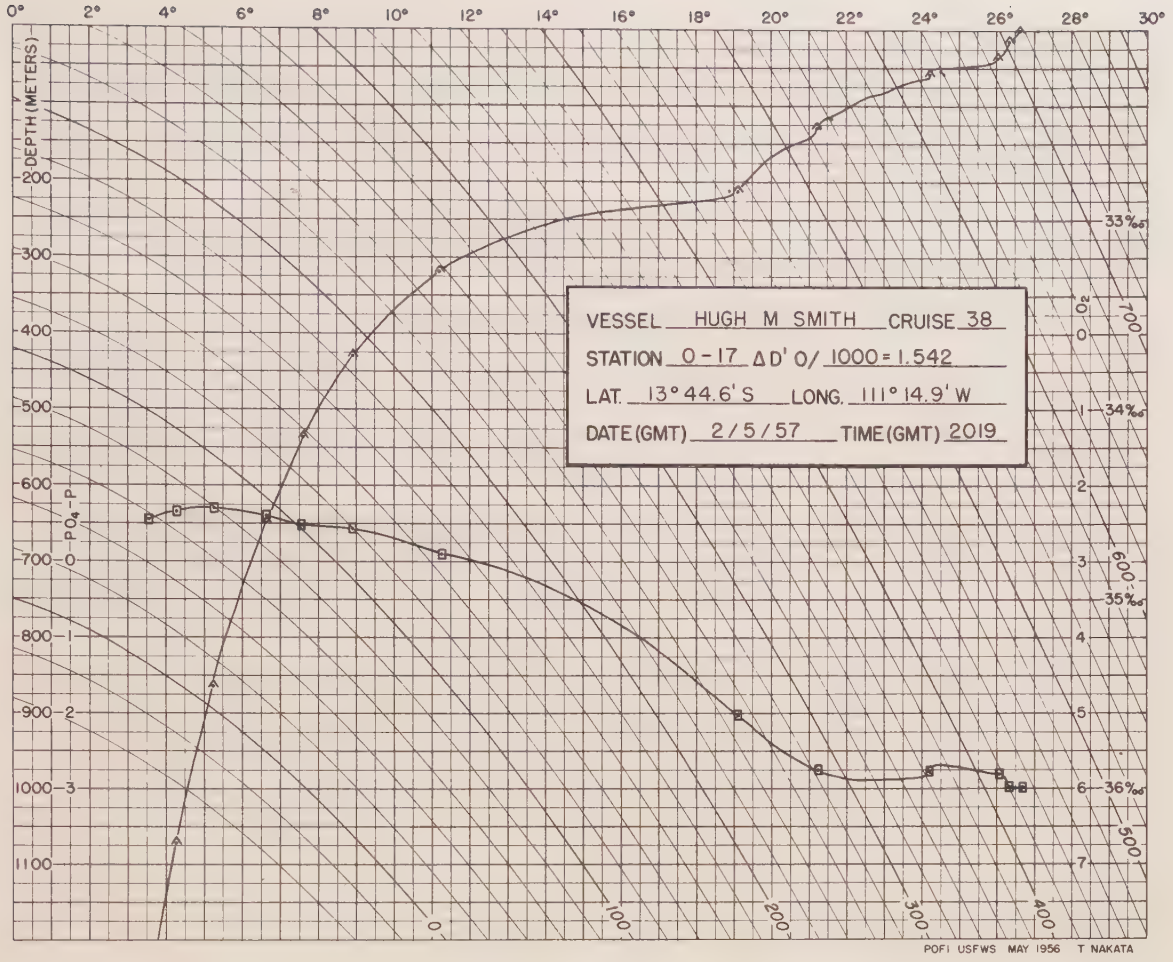
Weather: 02, cloud coverage 2. Wind: 070°, 12 kt. Sea: 3-5 ft. Wire angle: 14°
BT slide: 118. Dry bulb: 78.4°F. Wet bulb: 73.4°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.30	35.86	429.5	-	-
10	26.06	35.86	422.0	-	-
26	25.92	35.93	413.0	-	-
46	23.60	35.79	356.0	-	-
123	21.04	35.84	283.5	-	-
211	18.48	35.46	247.1	-	-
313	11.01	34.63	153.6	-	-
419	8.98	34.63	120.8	-	-
523	7.87	34.61	105.8	-	-
630	6.97	34.56	97.3	-	-
840	5.67	34.52	84.3	-	-
840	5.60	34.52	83.6	-	-
1044	4.54	34.52	71.8	-	-
1251	3.65	34.56	60.0	-	-



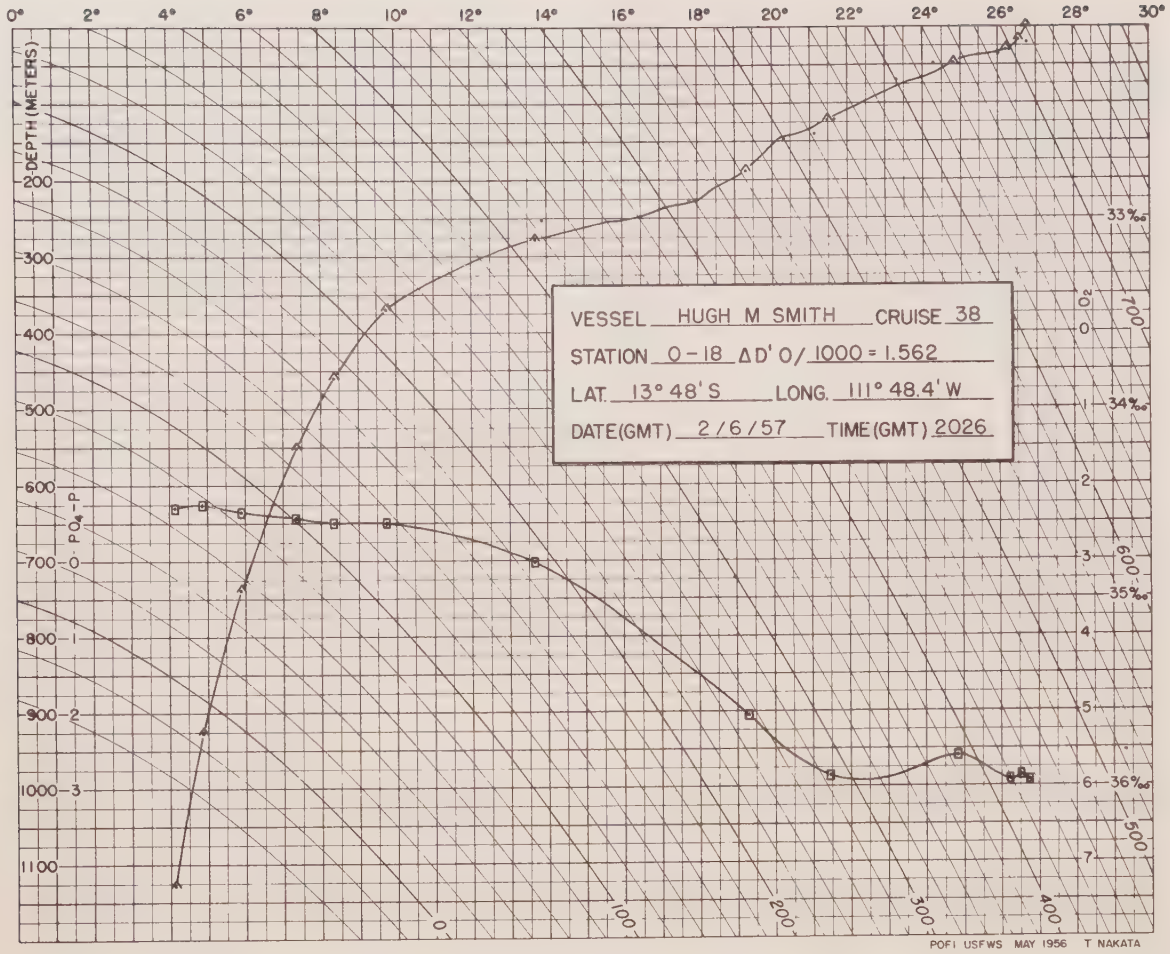
Weather: 02, cloud coverage 2. Wind: 080°, 05 kt. Sea: 1-3 ft. Wire angle: 09°.
BT slide: 120. Dry bulb: 80.0°F. Wet bulb: 72.8°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.63	35.93	434.4	-	-
8	26.30	35.91	425.9	-	-
19	26.28	35.95	422.5	-	-
35	25.87	35.95	410.2	-	-
91	21.86	35.84	304.8	-	-
154	19.86	35.81	255.4	-	-
226	15.07	35.37 P	177.0	-	-
300	10.64	34.69	143.0	-	-
300	10.83	34.69	146.2	-	-
372	9.04	34.65	120.3	-	-
445	8.19	34.65	107.6	-	-
593	6.72	34.58	92.7	-	-
740	5.74	34.54	83.7	-	-
895	4.94	34.52	75.9	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-17 ΔD' O/ 1000 = 1.542
LAT. 13°44.6' S LONG. 111°14.9' W
DATE (GMT) 2/5/57 TIME (GMT) 2019
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

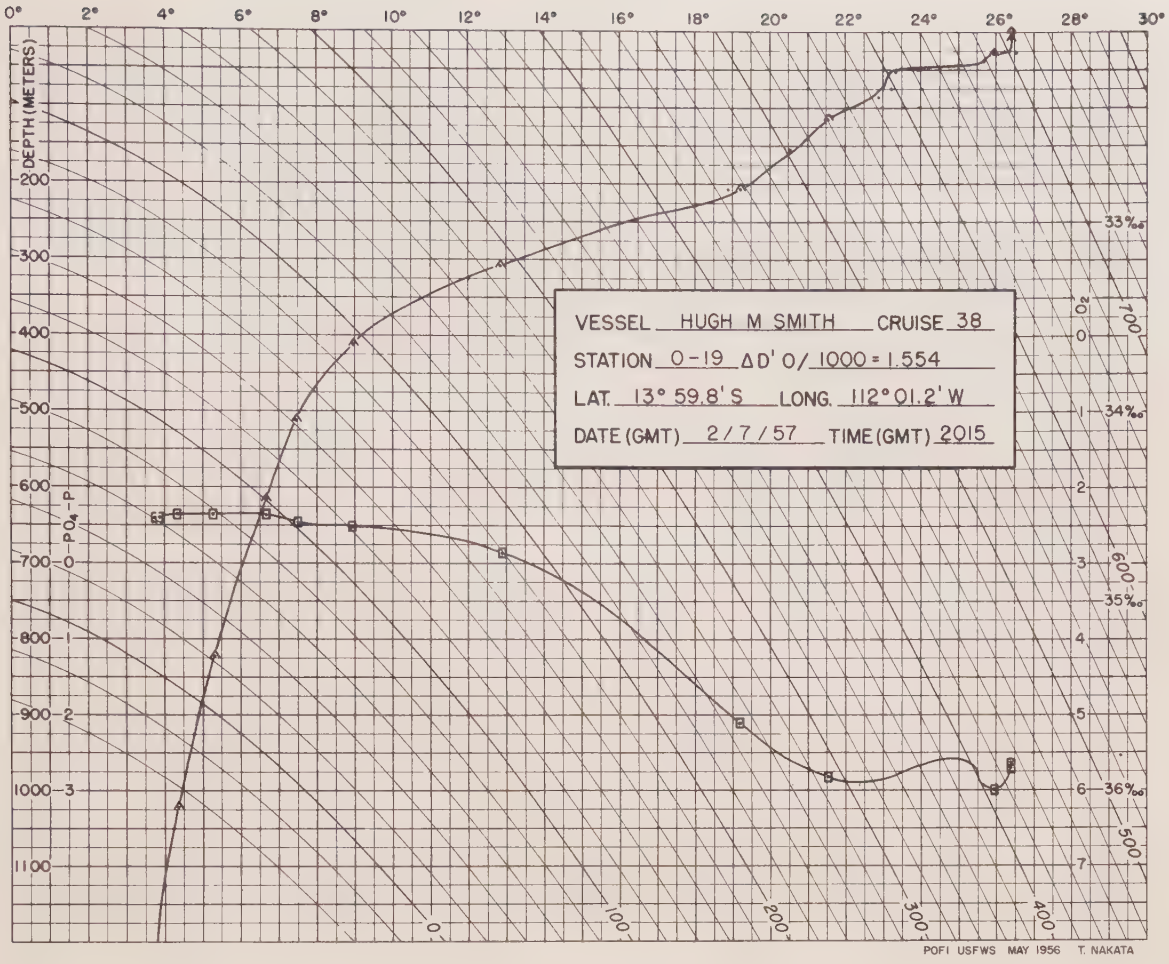
Weather: 02, cloud coverage 3. Wind: 080°, 11 kt. Sea: 1-3 ft. Wire angle: 03°.
BT slide: 123. Dry bulb: 80.4°F. Wet bulb: 75.0°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.65	35.99	430.8	-	-
15	26.36	35.99	421.8	-	-
36	26.05	35.93	417.0	-	-
57	24.24	35.91	365.6	-	-
129	21.26	35.90	284.8	-	-
212	19.10	35.61	251.2	-	-
319	11.21	34.76	147.7	-	-
430	8.91	34.63	119.8	-	-
536	7.60	34.61	102.3	-	-
647	6.63	34.56	93.2	-	-
863	5.26	34.52	79.6	-	-
1071	4.27	34.54	67.5	-	-
1281	3.58	34.58	57.8	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-18 ΔD' O/ 1000 = 1.562
LAT. 13° 48' S LONG. 111° 48.4' W
DATE(GMT) 2/6/57 TIME(GMT) 2026
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

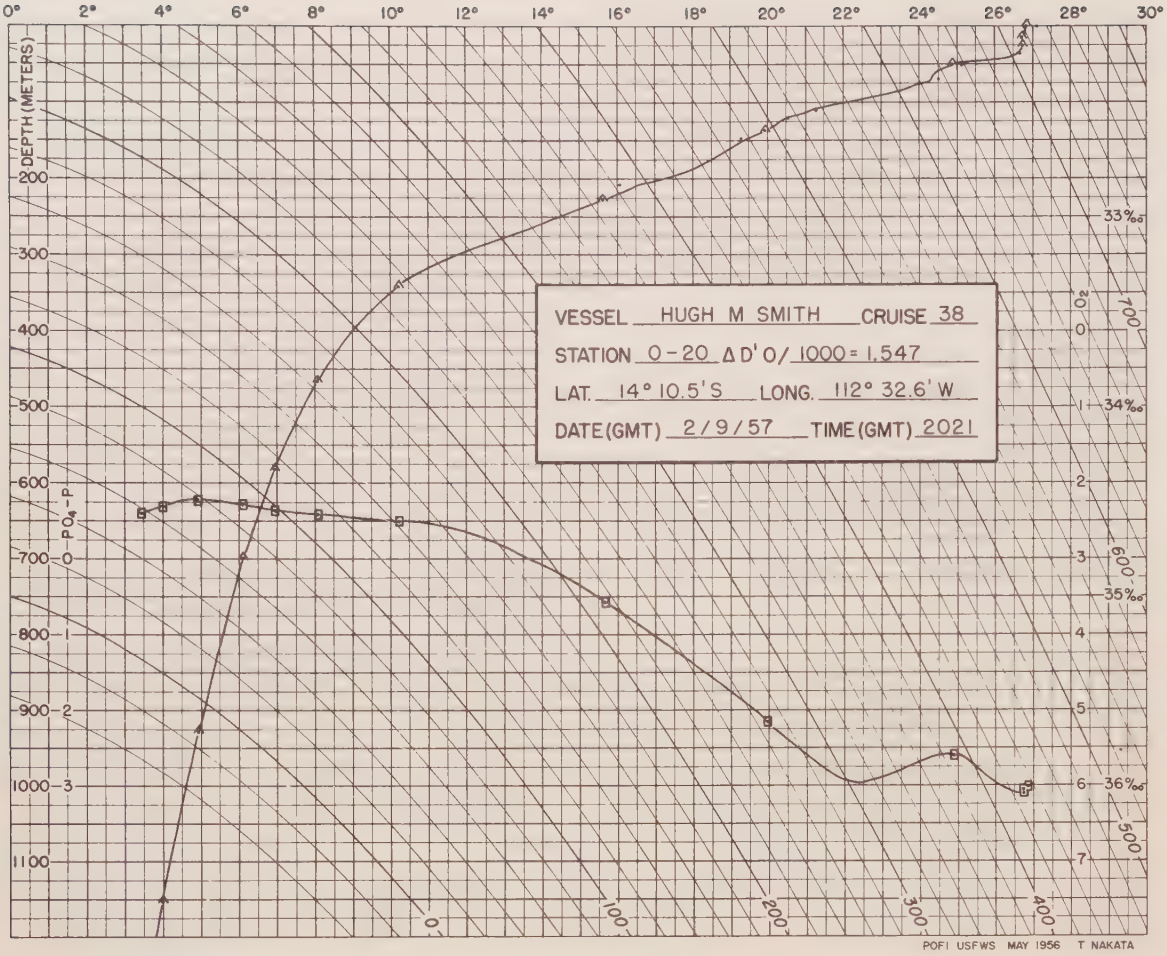
Weather: 02, cloud coverage 2. Wind: 070°, 12 kt. Sea: 3-5 ft. Wire angle: 31°.
BT slide: 126. Dry bulb: 80.0°F. Wet bulb: 73.8°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.76	35.97	435.2	-	-
17	26.55	35.95	430.5	-	-
30	26.22	35.97	419.0	-	-
47	24.82	35.84	387.4	-	-
122	21.47	35.95	286.8	-	-
188	19.30	35.62	255.3	-	-
276	13.72	34.81	190.5	-	-
368	9.78	34.60	135.7	-	-
457	8.36	34.60	113.8	-	-
551	7.36	34.58	101.2	-	-
738	5.90	34.54	85.5	-	-
926	4.87	34.51	75.9	-	-
1127	4.15	34.52	67.7	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-19 ΔD' O/ 1000 = 1.554
LAT. 13° 59.8' S LONG. 112° 01.2' W
DATE (GMT) 2/7/57 TIME (GMT) 2015
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T. NAKATA

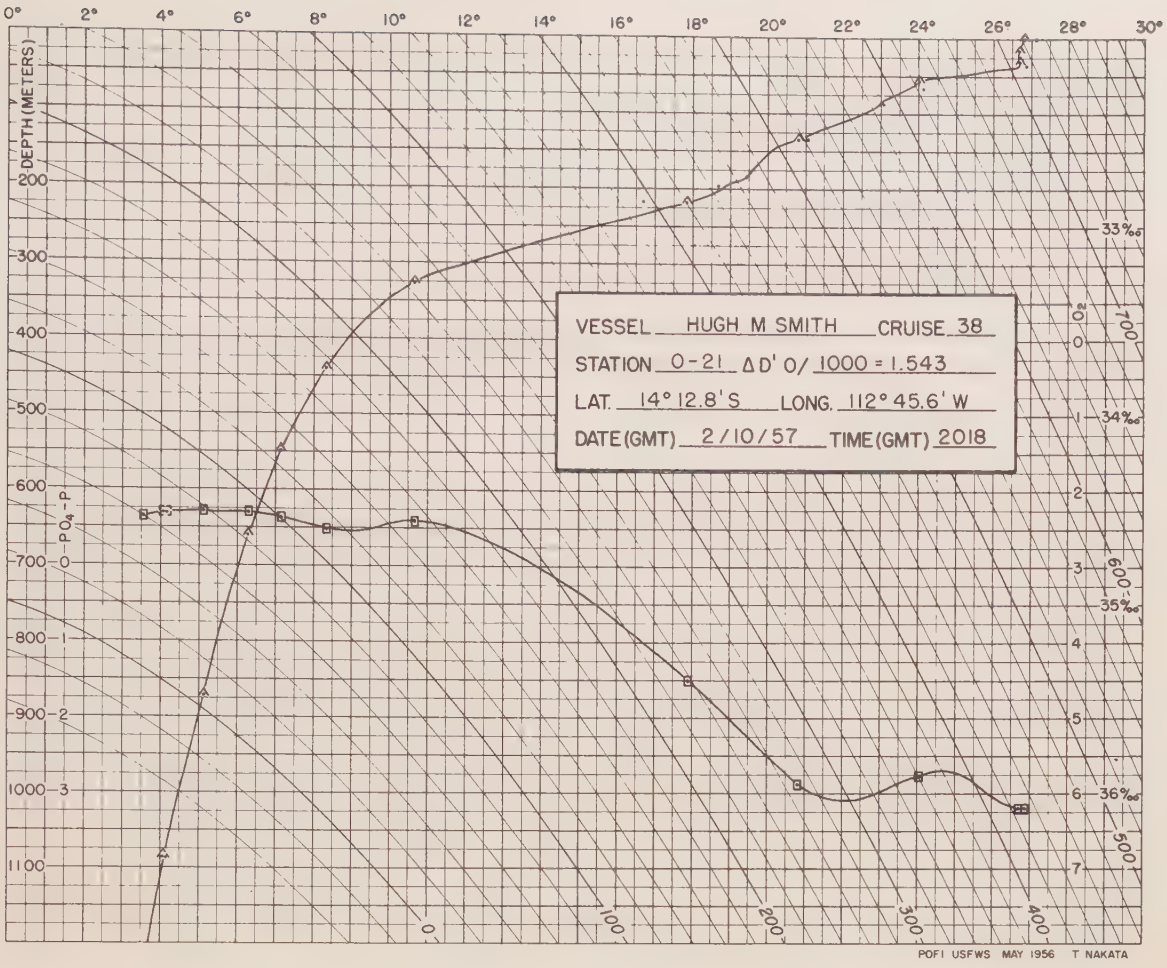
Weather: 15, cloud coverage 7. Wind: 090°, 18 kt. Sea: 3-5 ft. Wire angle: 20°.
BT slide: 128. Dry bulb: 77.9°F. Wet bulb: 73.3°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.40	35.88	431.2	-	-
5	26.38	35.86	432.2	-	-
10	26.41	35.88	431.3	-	-
30	25.92	36.00	408.0	-	-
115	21.54	35.93	290.0	-	-
206	19.20	35.64	251.5	-	-
307	12.87	34.74	179.1	-	-
412	8.95	34.60	122.7	-	-
512	7.46	34.58	102.5	-	-
617	6.66	34.54	95.0	-	-
822	5.30	34.54	78.6	-	-
1022	4.38	34.54	68.7	-	-
1227	3.83	34.56	61.8	-	-
1227	3.74	34.56	60.8	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-20 ΔD' O/ 1000 = 1.547
LAT. 14° 10.5' S LONG. 112° 32.6' W
DATE (GMT) 2/9/57 TIME (GMT) 2021
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

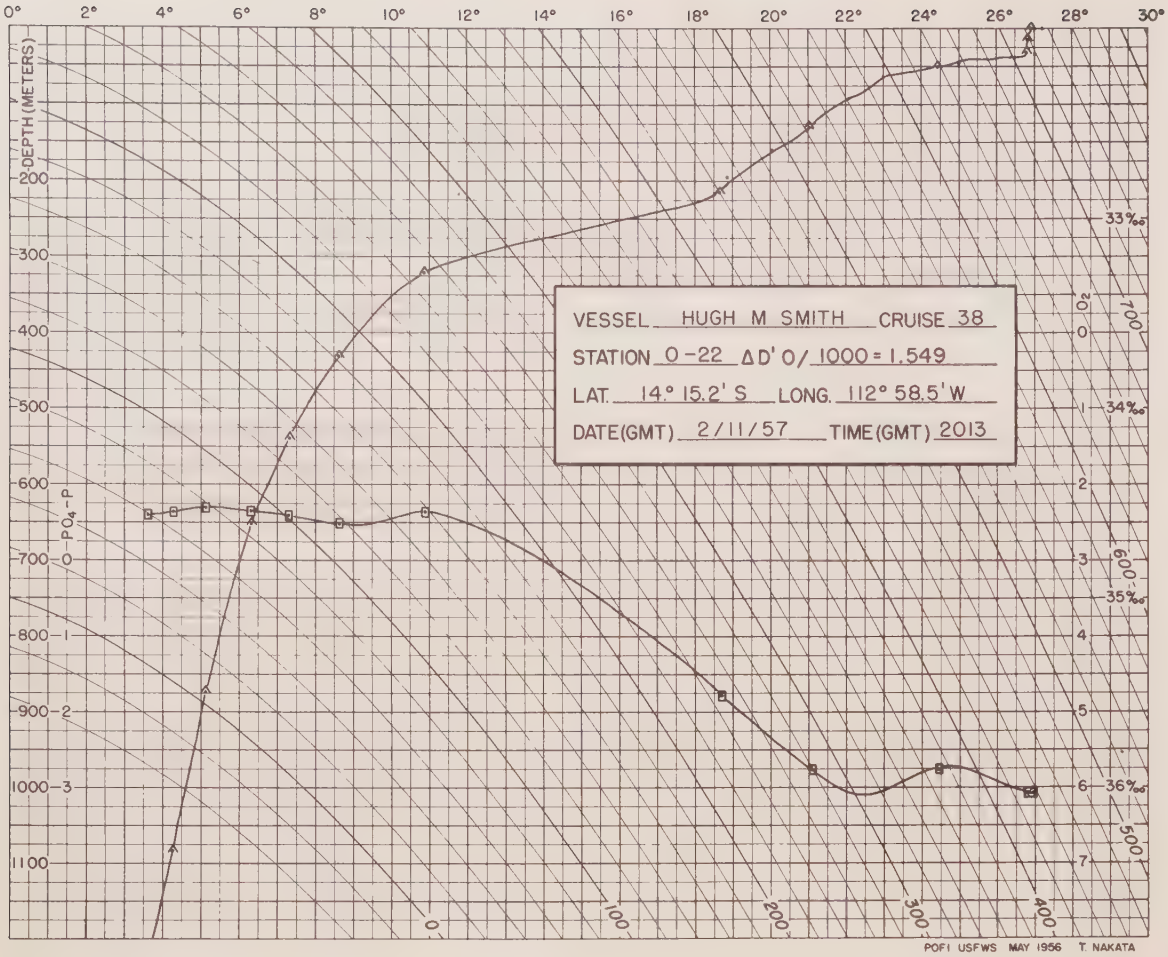
Weather: 02, cloud coverage 2. Wind: 090°, 14 kt. Sea: 3-5 ft. Wire angle: 15°.
BT slide: 131. Dry bulb: 79.8°F. Wet bulb: 73.2°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	26.84	36.00	435.6	-	-
13	26.76	36.02	431.8	-	-
25	26.74	36.04	429.8	-	-
52	24.88	35.84	388.8	-	-
138	19.94	35.66	268.5	-	-
227	15.66	35.03	214.3	-	-
342	10.22	34.60	142.7	-	-
465	8.10	34.56	113.0	-	-
582	6.96	34.54	98.7	-	-
699	6.17	34.51	90.8	-	-
927	4.93	34.49	78.2	-	-
1153	4.00	34.52	66.4	-	-
1367	3.44	34.56	58.2	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-21 ΔD' 0/1000 = 1.543
LAT. 14° 12.8' S LONG. 112° 45.6' W
DATE (GMT) 2/10/57 TIME (GMT) 2018
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

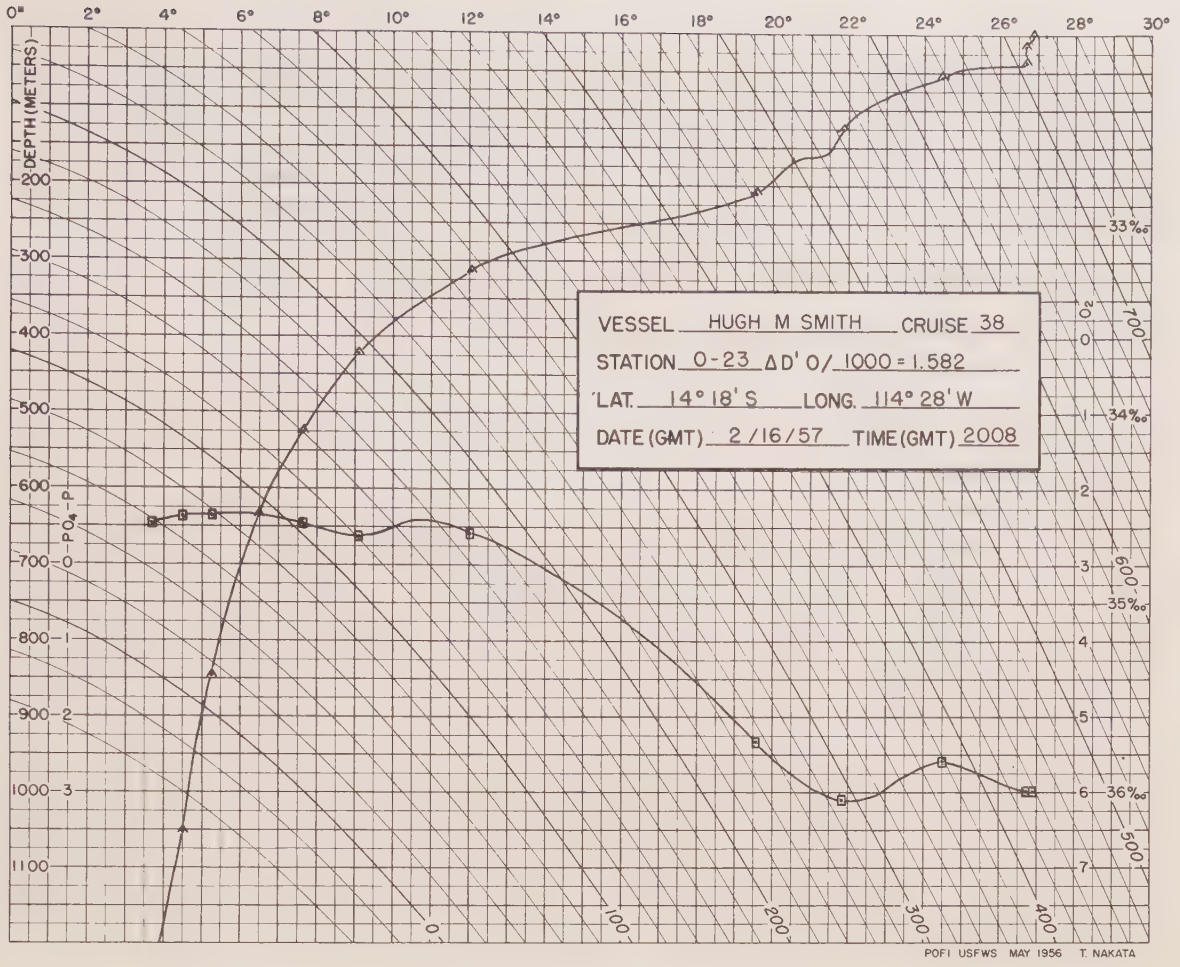
Weather: 02, cloud coverage 3. Wind: 090°, 13 kt. Sea: 3-5 ft. Wire angle: 23°.
BT slide: 133. Dry bulb: 80.0°F. Wet bulb: 73.5°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	26.84	36.08	430.0	-	-
15	26.70	36.08	425.6	-	-
30	26.71	36.08	425.7	-	-
55	24.06	35.90	361.1	-	-
133	20.82	35.95	269.9	-	-
218	17.89	35.39	238.2	-	-
326	10.66	34.56	152.8	-	-
440	8.36	34.60	113.8	-	-
549	7.18	34.54	101.5	-	-
658	6.32	34.52	92.2	-	-
871	5.13	34.51	79.0	-	-
1085	4.10	34.52	67.3	-	-
1085	4.15	34.52	67.9	-	-
1290	3.54	34.54	60.7	-	-



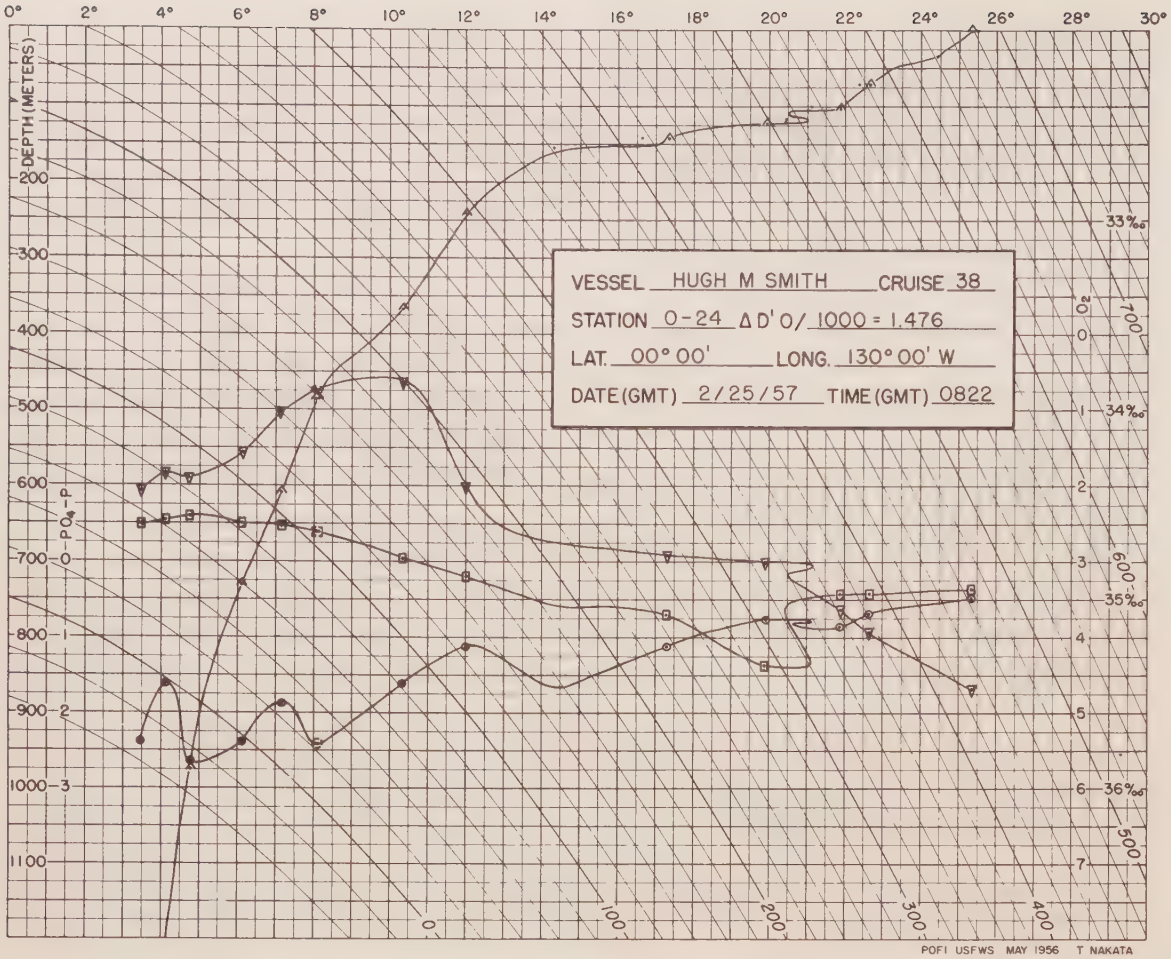
Weather: 03, cloud coverage 3. Wind: 070°, 11 kt. Sea: 3-5 ft. Wire angle: 04°.
BT slide: 135. Dry bulb: 79.6°F. Wet bulb: 73.2°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.96	36.02	437.7	-	-
15	26.82	36.02	433.3	-	-
31	26.82	36.02	433.3	-	-
52	24.44	35.90	372.2	-	-
130	21.06	35.90	279.3	-	-
214	18.68	35.50	249.2	-	-
320	10.89	34.54	158.1	-	-
432	8.62	34.61	117.1	-	-
539	7.31	34.56	102.1	-	-
652	6.34	34.54	91.0	-	-
870	5.16	34.52	78.4	-	-
1083	4.26	34.54	67.4	-	-
1300	3.60	34.56	59.7	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-23 ΔD' O/ 1000 = 1.582
LAT. 14° 18' S LONG. 114° 28' W
DATE (GMT) 2/16/57 TIME (GMT) 2008
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

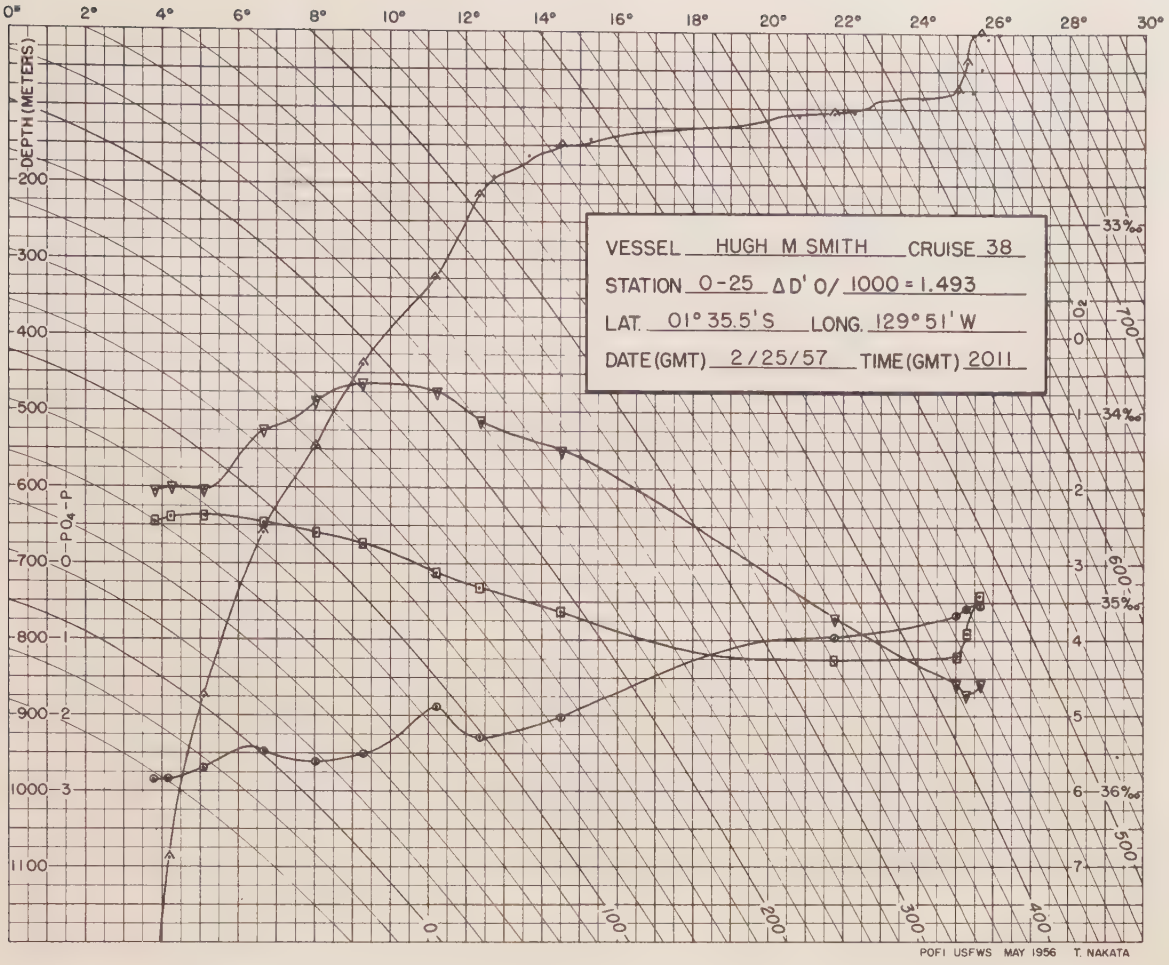
Weather: 01, cloud coverage 2. Wind: 080°, 12 kt. Sea: 3-5 ft. Wire angle: 14°.
BT slide: 140. Dry bulb: 80.7°F. Wet bulb: 73.6°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.88	36.00	437.0	-	-
15	26.71	35.99	432.2	-	-
35	26.70	35.99	432.0	-	-
56	24.48	35.84	377.4	-	-
127	21.82	36.04	289.2	-	-
210	19.58	35.73	254.2	-	-
313	12.10	34.63	172.8	-	-
422	9.10	34.63	122.6	-	-
526	7.63	34.58	105.0	-	-
634	6.49	34.54	92.7	-	-
846	5.24	34.54	78.0	-	-
1051	4.47	34.54	69.6	-	-
1259	3.67	34.58	58.7	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-24 Δ D' O/ 1000 = 1.476
LAT. 00° 00' LONG. 130° 00' W
DATE (GMT) 2/25/57 TIME (GMT) 0822
DEPTH (METERS)
POF1 USFWS MAY 1956 T NAKATA

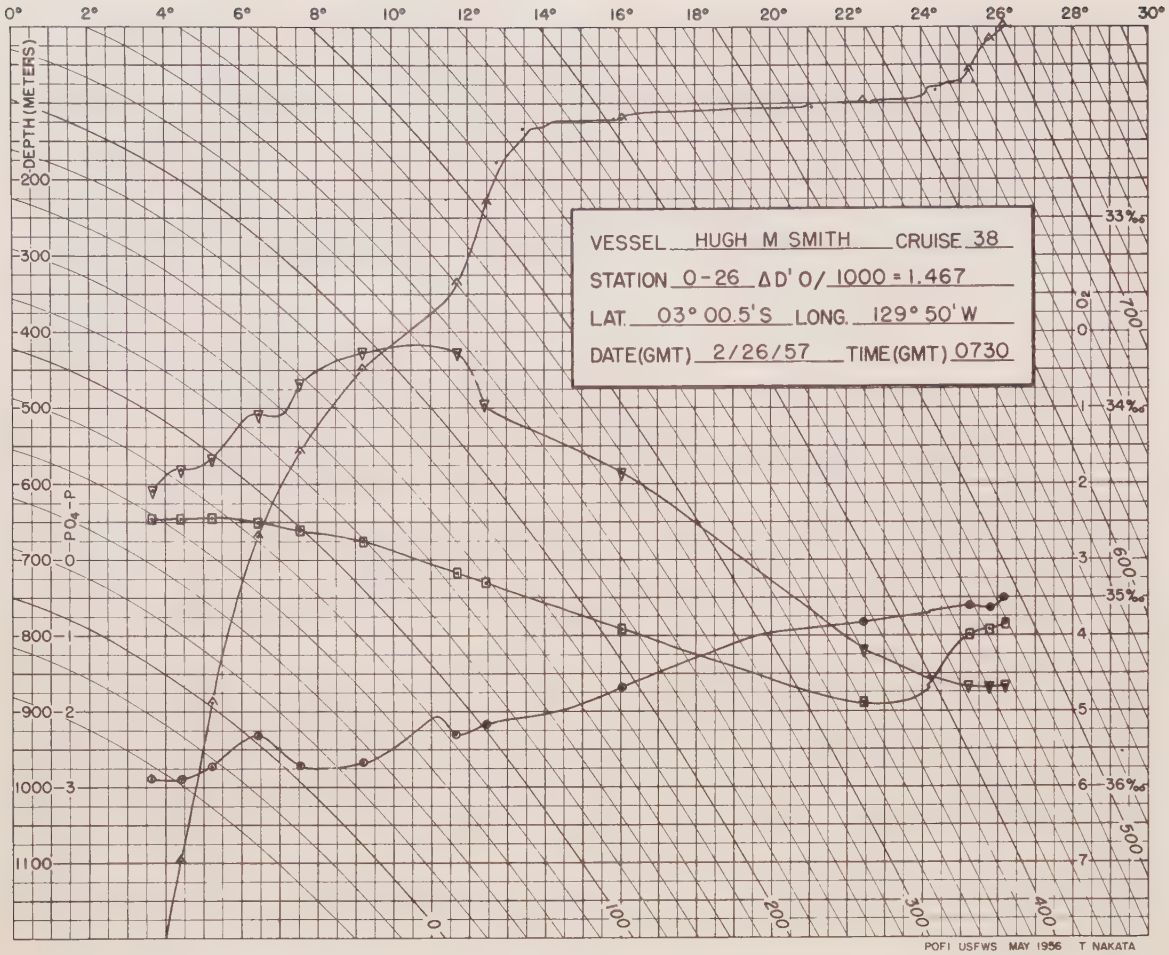
Weather: 02, cloud coverage 2. Wind: 090°, 08 kt. Sea: 1-3 ft. Wire angle: 23°.
BT slide: 147. Dry bulb: 77.8°F. Wet bulb: 74.7°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	25.37	34.94	468.0	4.69	0.48
71	22.64	34.97	388.7	3.91	0.69
102	21.89	34.97	368.5	3.62	0.84
122	19.90	35.34	290.4	2.99	0.75
142	17.34	35.08	248.0	2.91	1.12
244	12.02	34.88	153.1	2.01	1.12
367	10.35	34.78	131.4	0.62	1.62
485	8.12	34.65	106.7	0.75	2.42
485	8.07	34.65	105.9	-	-
610	7.18	34.61	96.3	1.03	1.87
730	6.13	34.60	83.8	1.55	2.38
974	4.74	34.56	70.8	1.90	2.66
1208	4.10	34.58	62.7	1.84	1.62
1429	3.46	34.61	54.6	2.06	2.37


VESSEL HUGH M SMITH CRUISE 38
STATION 0-25 ΔD' O/ 1000 = 1.493
LAT. 01° 35.5' S LONG. 129° 51' W
DATE (GMT) 2/25/57 TIME (GMT) 2011
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

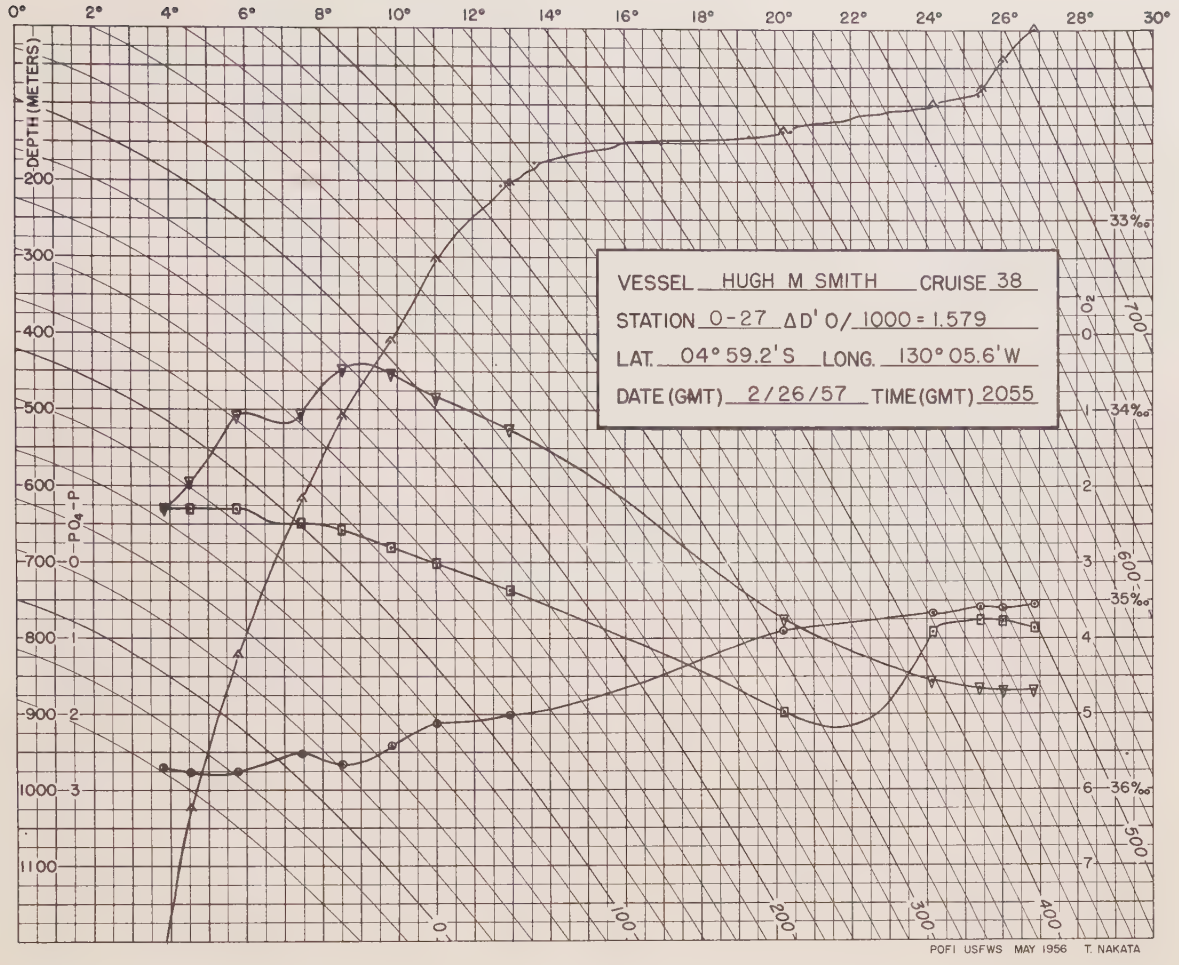
Weather: 03, cloud coverage 6. Wind: 110°, 10 kt. Sea: 1-3 ft. Wire angle: < 05°.
BT slide: 151. Dry bulb: 80.0°F. Wet bulb: 75.5°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	25.69	34.96	476.1	4.57	0.55
37	25.30	35.16	450.2	4.71	0.58
73	25.06	35.28	434.5	4.57	0.66
105	21.79	35.30	342.0	3.70	0.96
152	14.52	35.05	189.0	1.49	2.02
216	12.38	34.92	156.7	1.11	2.28
324	11.21	34.85	141.2	0.73	1.89
437	9.30	34.69	121.2	0.63	2.52
545	8.04	34.63	106.9	0.85	2.61
658	6.70	34.58	92.5	1.14	2.47
877	5.12	34.54	76.6	2.01	2.67
1089	4.22	34.56	65.6	2.02	2.86
1297	3.82	34.58	60.2	2.03	2.83


VESSEL HUGH M SMITH CRUISE 38
STATION 0-26 ΔD' O/ 1000 = 1.467
LAT. 03° 00.5'S LONG. 129° 50' W
DATE(GMT) 2/26/57 TIME(GMT) 0730
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

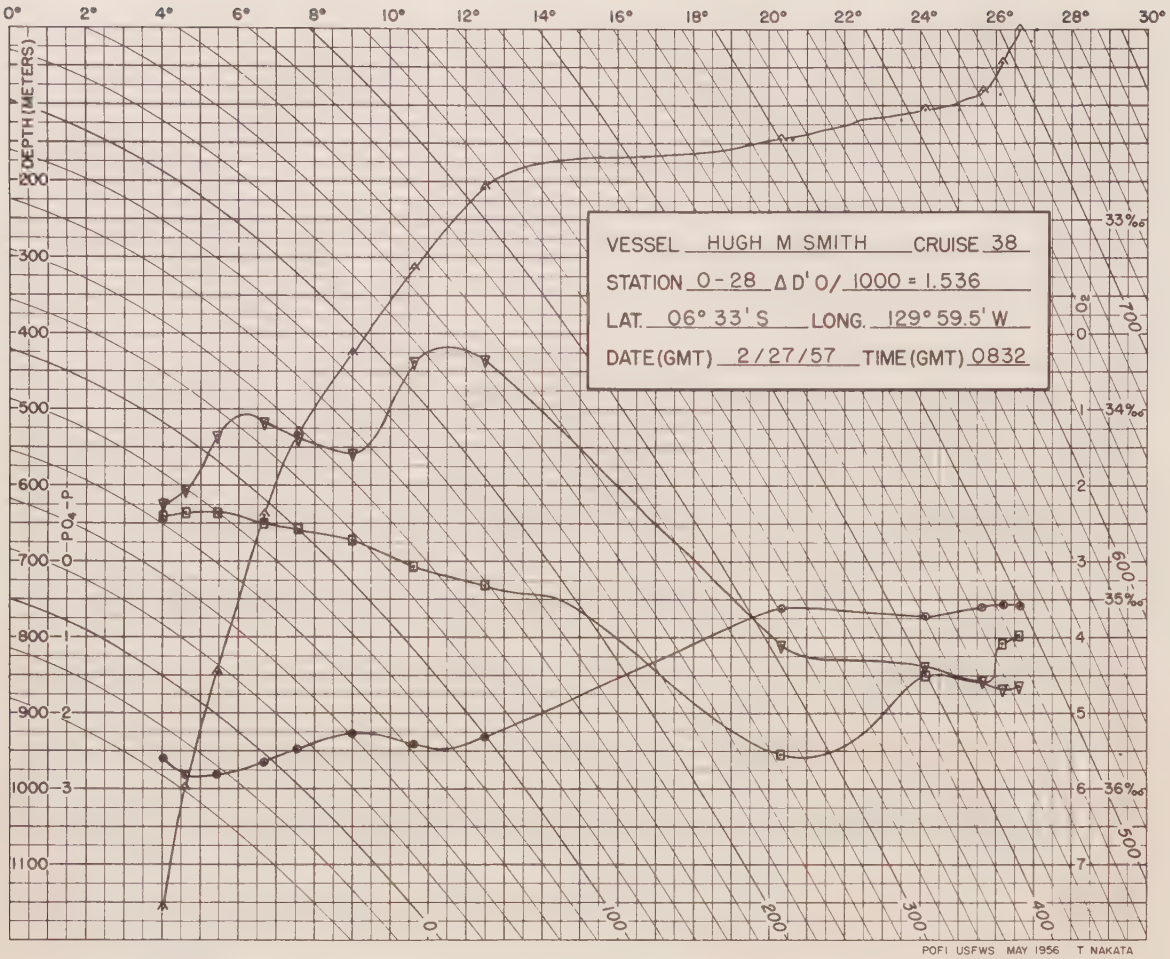
Weather: 02, cloud coverage 3. Wind: 110°, 08 kt. Sea: 1-3 ft. Wire angle: 06°.
BT slide: 154. Dry bulb: 79.2°F. Wet bulb: 75.7°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	26.19	35.14	477.9	4.68	0.52
16	25.80	35.17	464.2	4.69	0.62
57	25.26	35.19	446.8	4.67	0.60
99	22.46	35.55	341.9	4.17	0.81
120	16.08	35.17	213.2	1.84	1.68
230	12.46	34.92	158.3	0.94	2.17
337	11.71	34.87	148.4	0.29	2.30
450	9.20	34.70	119.0	0.29	2.68
558	7.58	34.65	99.0	0.68	2.71
670	6.46	34.60	87.9	1.09	2.32
889	5.24	34.58	74.9	1.65	2.72
1098	4.42	34.58	66.3	1.80	2.90
1305	3.66	34.58	58.7	2.08	2.89



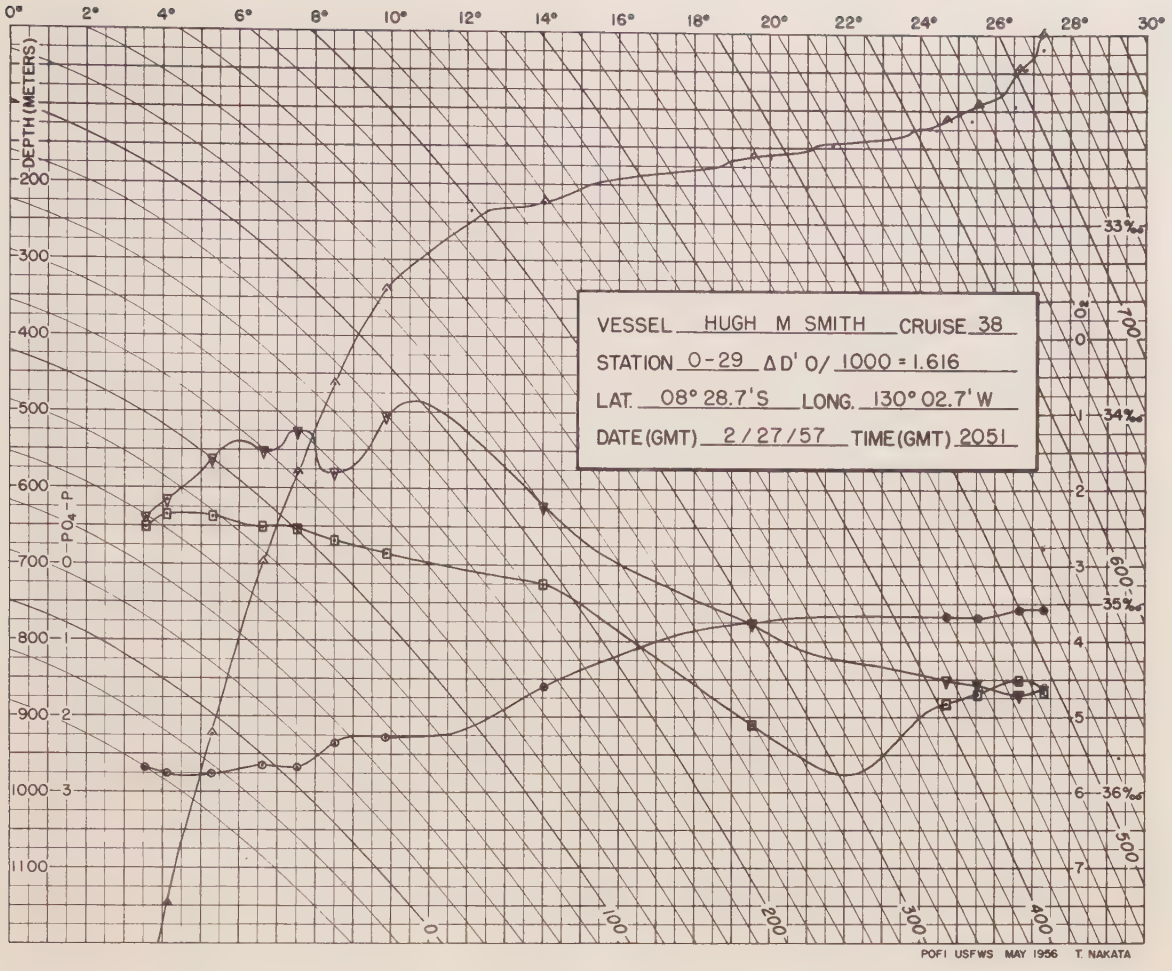
Weather: 02, cloud coverage 4. Wind: 110°, 06 kt. Sea: 1-3 ft. Wire angle: 12°.
BT slide: 157. Dry bulb: 80.2°F. Wet bulb: 74.9°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.86	35.14	497.9	4.67	0.54
40	26.02	35.10	475.6	4.68	0.60
80	25.42	35.10	457.8	4.65	0.58
100	24.19	35.17	417.3	4.54	0.66
135	20.22	35.59	280.7	3.73	0.90
205	12.91	34.94	165.4	1.26	2.02
305	11.02	34.81	140.8	0.84	2.12
411	9.82	34.72	127.5	0.52	2.42
512	8.56	34.63	114.6	0.48	2.66
617	7.49	34.60	101.4	1.06	2.52
823	5.80	34.52	85.9	1.09	2.76
1023	4.57	34.52	72.2	1.95	2.76
1228	3.84	34.52	65.0	2.29	2.70


VESSEL HUGH M SMITH CRUISE 38
STATION 0-28 Δ D' O/ 1000 = 1.536
LAT. 06° 33' S LONG. 129° 59.5' W
DATE (GMT) 2/27/57 TIME (GMT) 0832
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

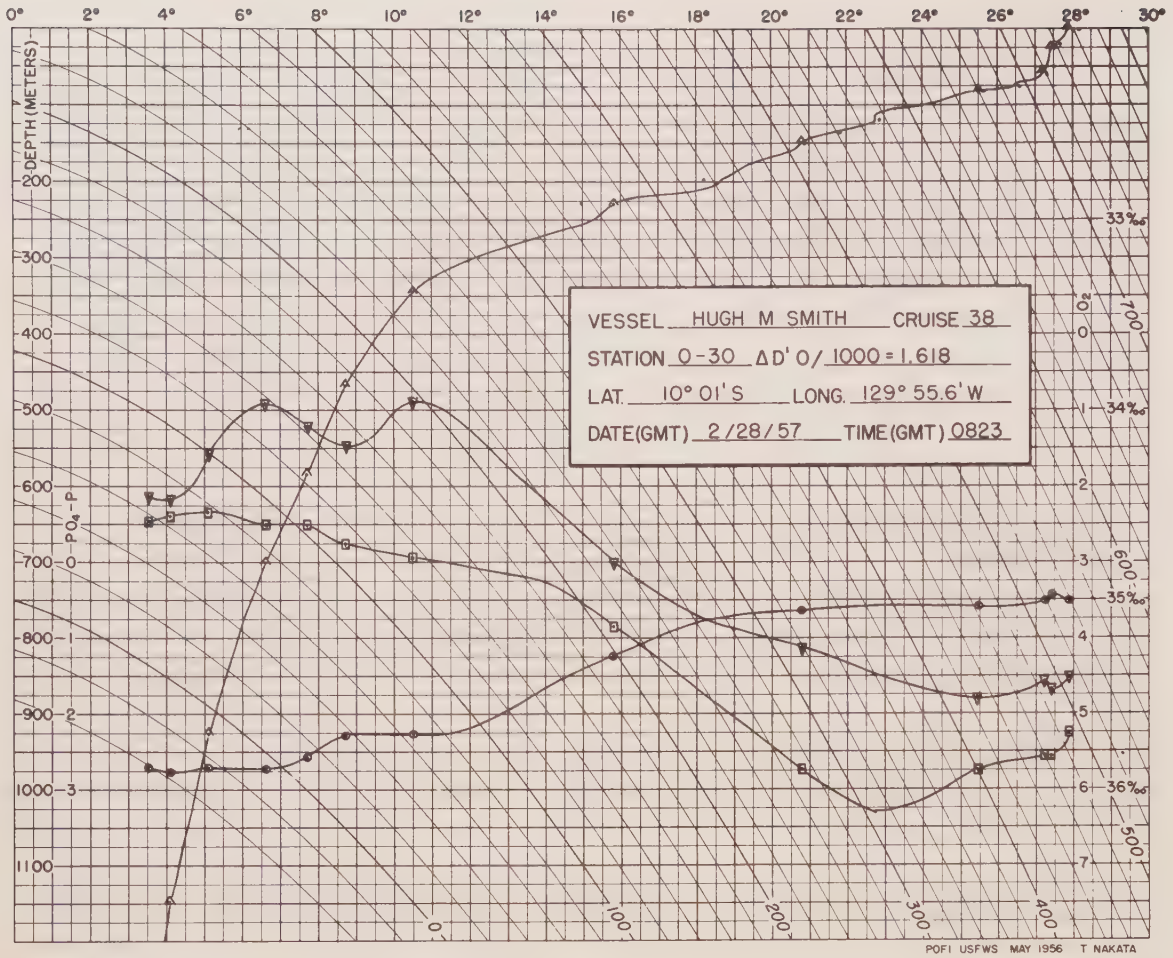
Weather: 02, cloud coverage 1. Wind: 110°, 10 kt. Sea: 1-3 ft. Wire angle: 20°.
BT slide: 160. Dry bulb: 79.3°F. Wet bulb: 75.8°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	26.62	35.19	487.3	4.65	0.60
43	26.18	35.23	471.3	4.69	0.56
81	25.68	35.43	441.8	4.58	0.60
105	24.17	35.41	399.4	4.39	0.71
144	20.33	35.82	266.8	4.10	0.62
210	12.48	34.92	158.6	0.32	2.32
316	10.62	34.83	132.4	0.37	2.42
426	9.00	34.69	116.7	1.58	2.28
532	7.59	34.63	100.5	1.35	2.48
638	6.70	34.60	90.9	1.17	2.66
846	5.46	34.54	80.2	1.33	2.82
1000	4.62	34.54	71.1	2.08	2.82
1158	4.08	34.56	64.0	2.24	2.60


VESSEL HUGH M SMITH CRUISE 38
STATION 0-29 ΔD' O/ 1000 = 1.616
LAT. 08° 28.7'S LONG. 130° 02.7' W
DATE (GMT) 2/27/57 TIME (GMT) 2051
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

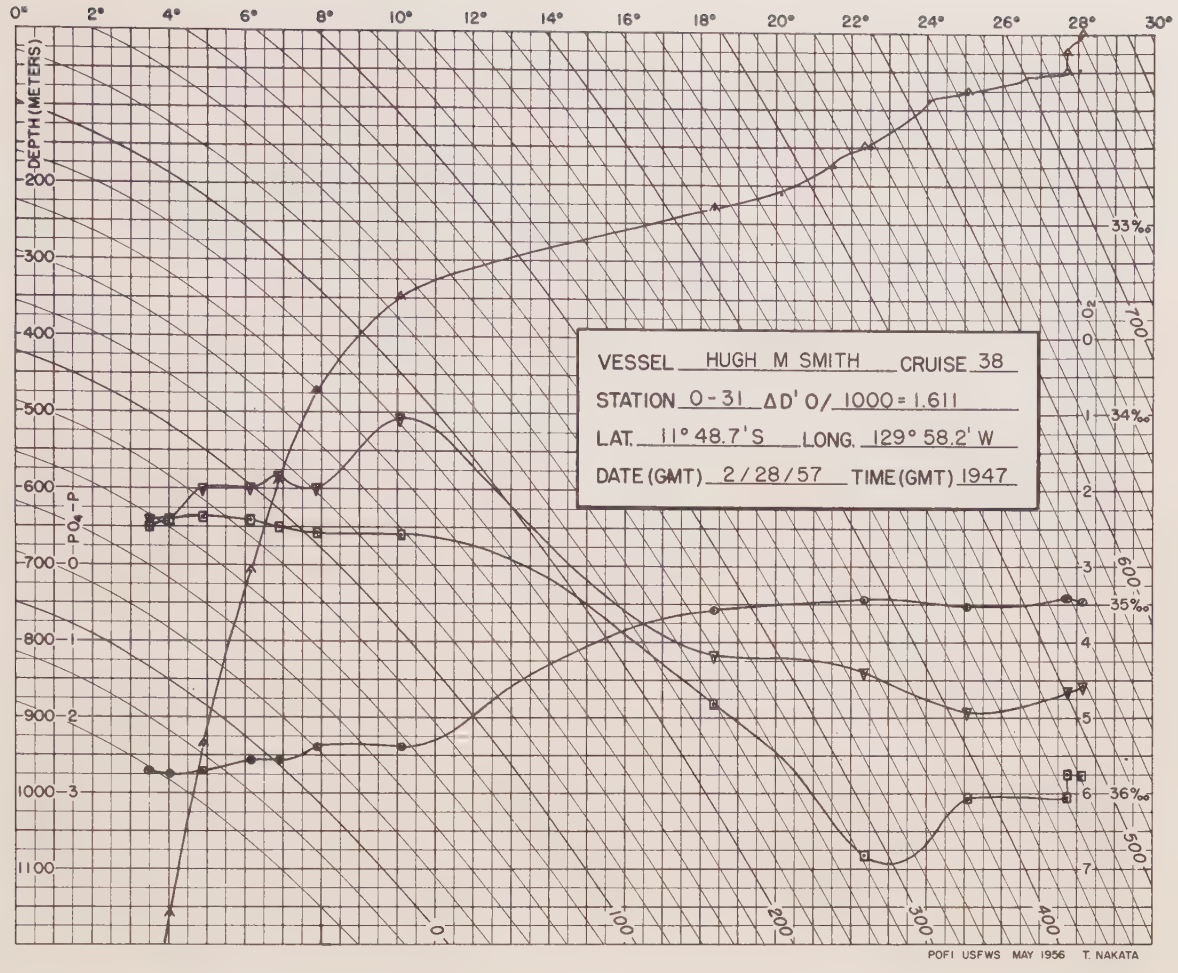
Weather: 02, cloud coverage 1. Wind: 080°, 12 kt. Sea: 1-3 ft. Wire angle: 12°.
BT slide: 163. Dry bulb: 80.3°F. Wet bulb: 75.1°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	27.30	35.46	488.4	4.62	0.58
45	26.64	35.41	472.2	4.70	0.58
91	25.56	35.48	434.8	4.57	0.68
112	24.71	35.53	406.5	4.52	0.66
163	19.59	35.64	261.0	3.75	0.74
225	14.04	34.90	190.3	2.21	1.61
340	9.88	34.74	126.7	1.05	2.29
463	8.51	34.67	111.0	1.77	2.35
580	7.56	34.61	89.4	1.25	2.66
697	6.64	34.61	89.4	1.52	2.64
923	5.30	34.54	78.5	1.62	2.76
1148	4.12	34.54	66.2	2.15	2.76
1362	3.58	34.60	56.3	2.38	2.66


VESSEL HUGH M SMITH CRUISE 38
STATION 0-30 ΔD' 0/ 1000 = 1.618
LAT. 10° 01' S LONG. 129° 55.6' W
DATE(GMT) 2/28/57 TIME(GMT) 0823
DEPTH (METERS)
O-PO4-P
POFI USFWS MAY 1956 T NAKATA

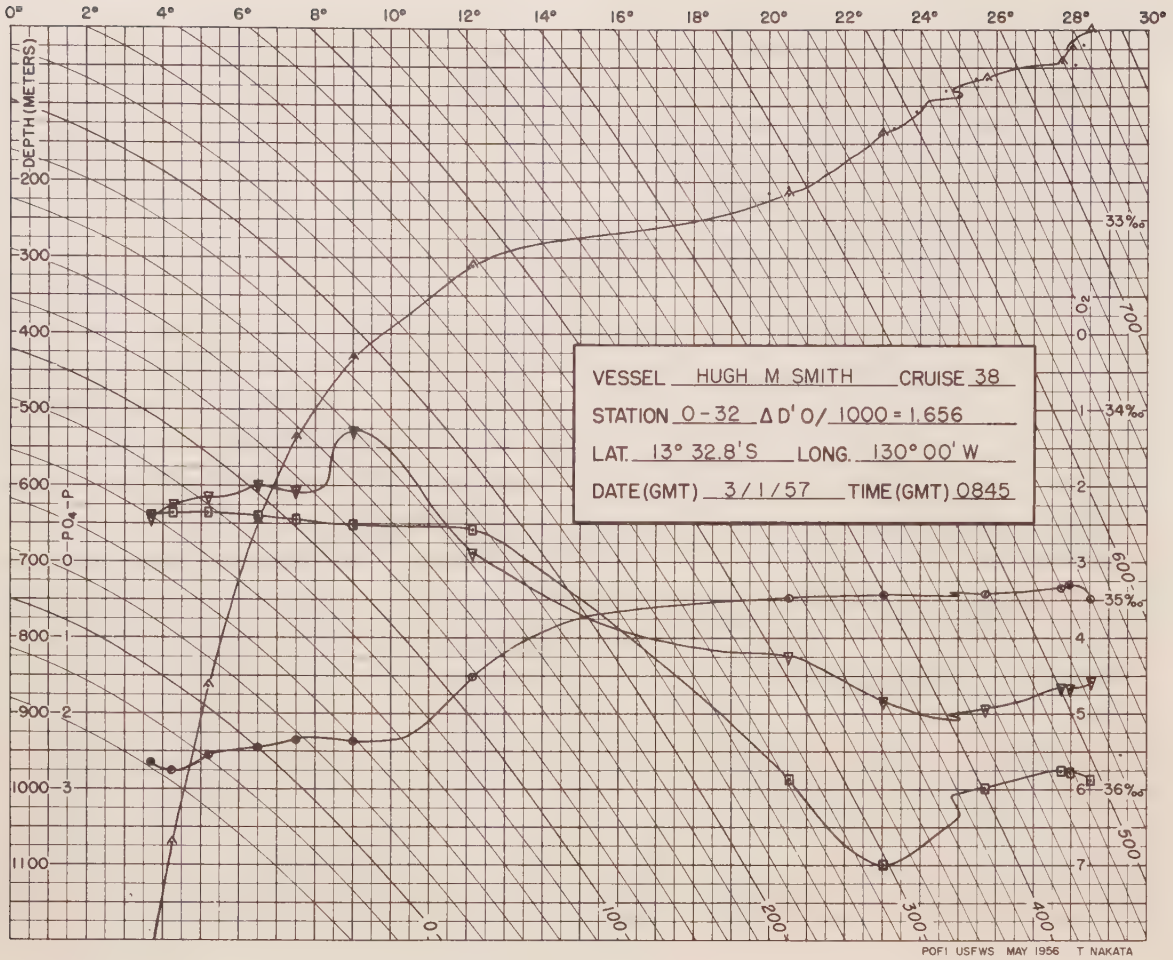
Weather: 02, cloud coverage 1. Wind: 090°, 07 kt. Sea: 1-3 ft. Wire angle: 10°.
BT slide: 165. Dry bulb: 81.0°F. Wet bulb: 75.1°F. Barometric pressure: 1012 mb.

Depth, m.	^{o}T, ^{o}C.	^{o}S, ^{o}/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.88	35.70	489.4	4.52	0.52
26	27.41	35.82	466.1	4.66	0.44
57	27.24	35.82	460.7	4.59	0.52
82	25.48	35.90	402.3	4.80	0.58
150	20.81	35.90	273.3	4.13	0.64
229	15.82	35.14	209.8	3.01	1.22
345	10.53	34.78	134.7	0.88	2.27
467	8.75	34.69	112.8	1.47	2.27
584	7.72	34.61	104.2	1.22	2.57
700	6.62	34.60	90.1	0.93	2.72
926	5.12	34.54	76.4	1.58	2.71
1149	4.15	34.56	64.8	2.16	2.76
1358	3.55	34.58	57.7	2.14	2.71


VESSEL HUGH M SMITH CRUISE 38
STATION 0-31 ΔD' O/ 1000 = 1.611
LAT. 11° 48.7' S LONG. 129° 58.2' W
DATE (GMT) 2/28/57 TIME (GMT) 1947
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T. NAKATA

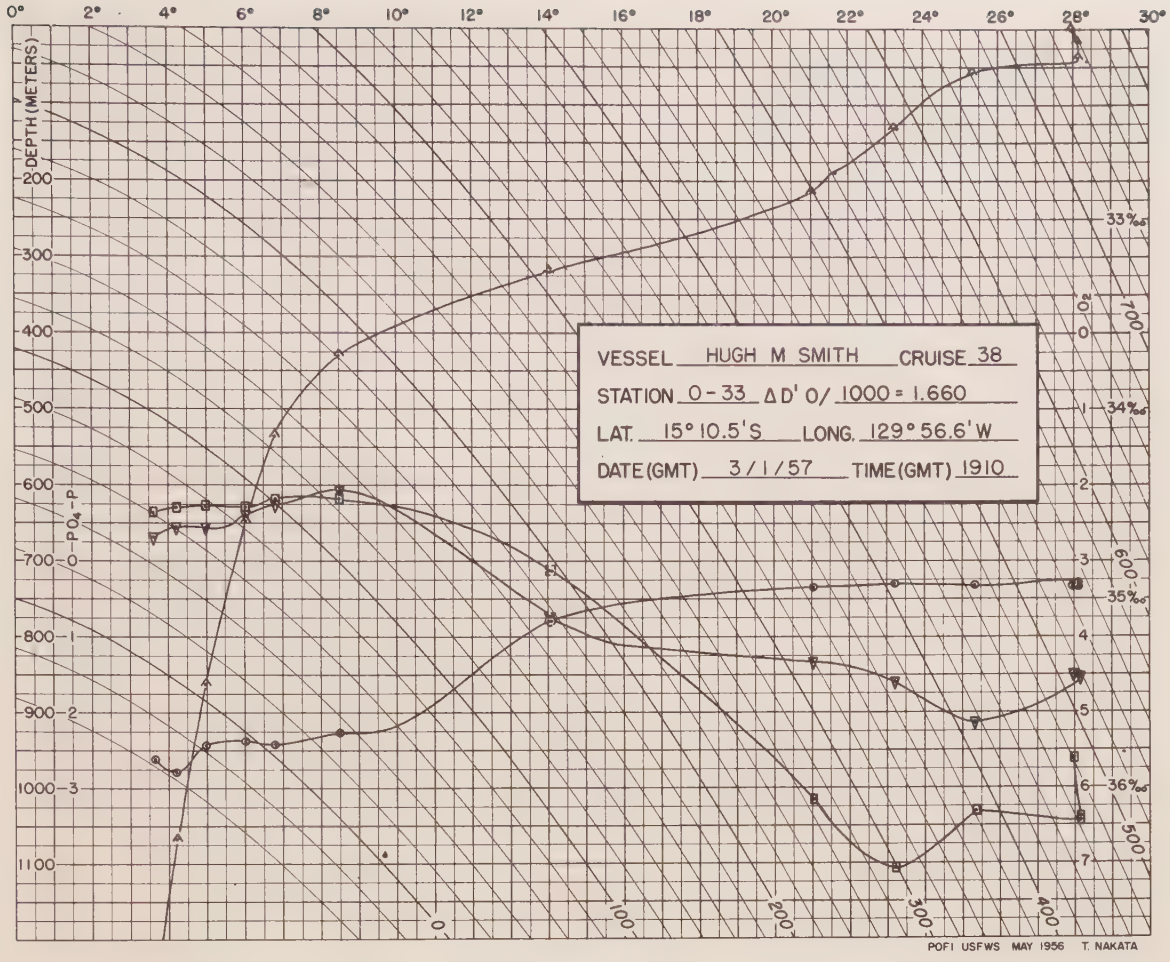
Weather: 02, cloud coverage 1. Wind: 070°, 11 kt. Sea: 1-3 ft. Wire angle: 03°.
BT slide: 169. Dry bulb: 83.0°F. Wet bulb: 75.2°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.14	35.90	482.9	4.58	0.46
26	27.73	35.90	470.5	4.64	0.42
52	27.74	36.02	462.2	4.65	0.42
78	25.07	36.02	381.6	4.92	0.53
151	22.35	36.33	282.6	4.39	0.44
232	18.38	35.52	240.3	4.16	0.58
350	10.10	34.63	138.3	1.06	2.39
473	7.89	34.63	104.7	1.99	2.39
591	6.88	34.60	93.2	1.83	2.57
708	6.18	34.56	87.3	1.97	2.55
936	4.90	34.54	74.0	1.99	2.70
1159	4.02	34.56	63.6	2.38	2.73
1365	3.46	34.60	55.4	2.40	2.70


VESSEL HUGH M SMITH CRUISE 38
STATION 0-32 ΔD'O/1000 = 1.656
LAT. 13° 32.8'S LONG. 130° 00' W
DATE (GMT) 3/1/57 TIME (GMT) 0845
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T NAKATA

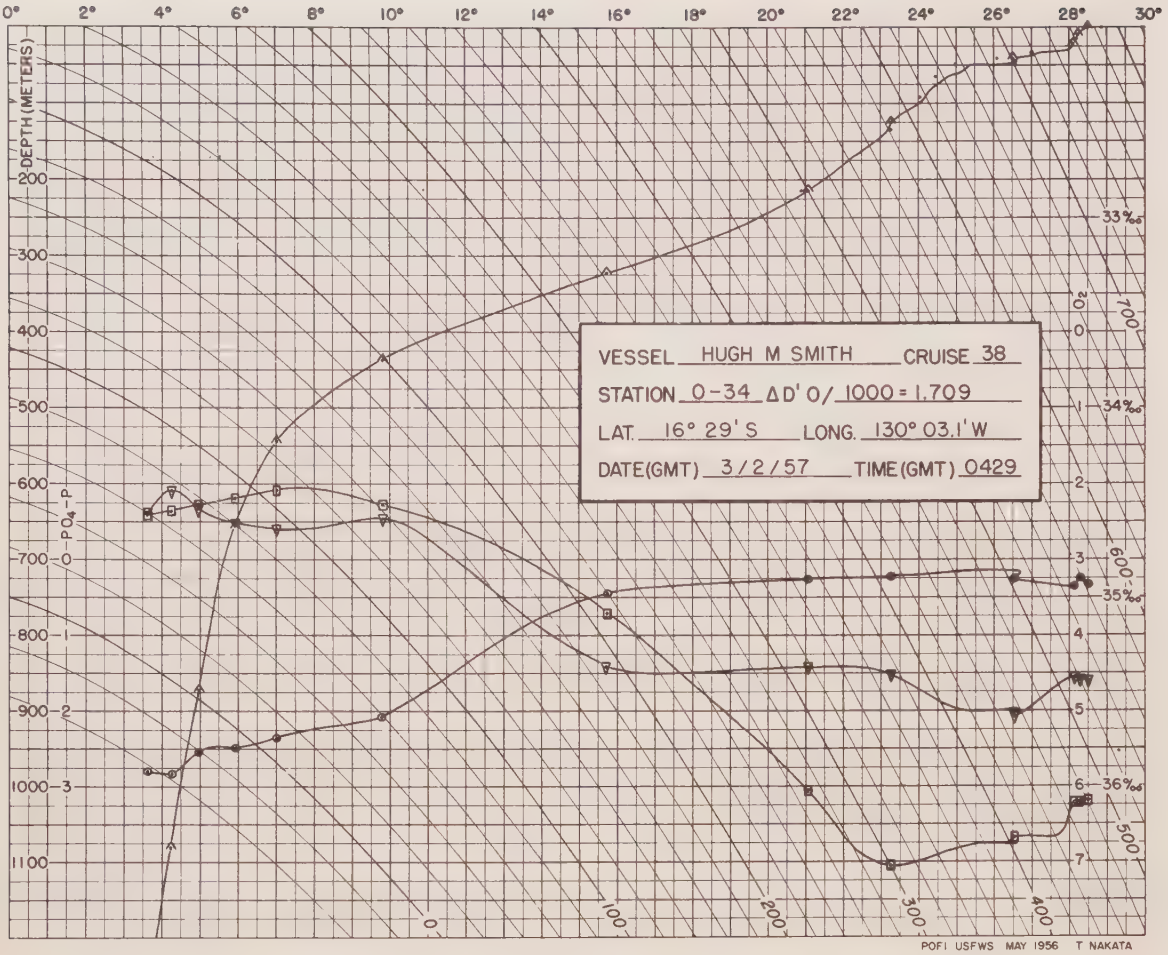
Weather: 03, cloud coverage 5. Wind: 250°, 04 kt. Sea: 1-3 ft. Wire angle: 10°.
BT slide: 171. Dry bulb: 80.4°F. Wet bulb: 74.1°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.53	35.95	492.0	4.59	0.48
21	27.96	35.91	476.5	4.66	0.30
42	27.74	35.90	470.5	4.65	0.33
63	25.72	35.99	402.8	4.93	0.42
136	23.04	36.40	296.4	4.82	0.43
215	20.56	35.95	263.0	4.22	0.47
321	12.19	34.63	174.5	2.87	1.52
432	9.02	34.61	123.2	1.28	2.37
538	7.52	34.58	103.4	2.08	2.35
648	6.52	34.56	91.6	2.00	2.47
864	5.21	34.54	77.7	2.16	2.57
1072	4.26	34.54	67.3	2.25	2.76
1281	3.68	34.56	60.1	2.42	2.66



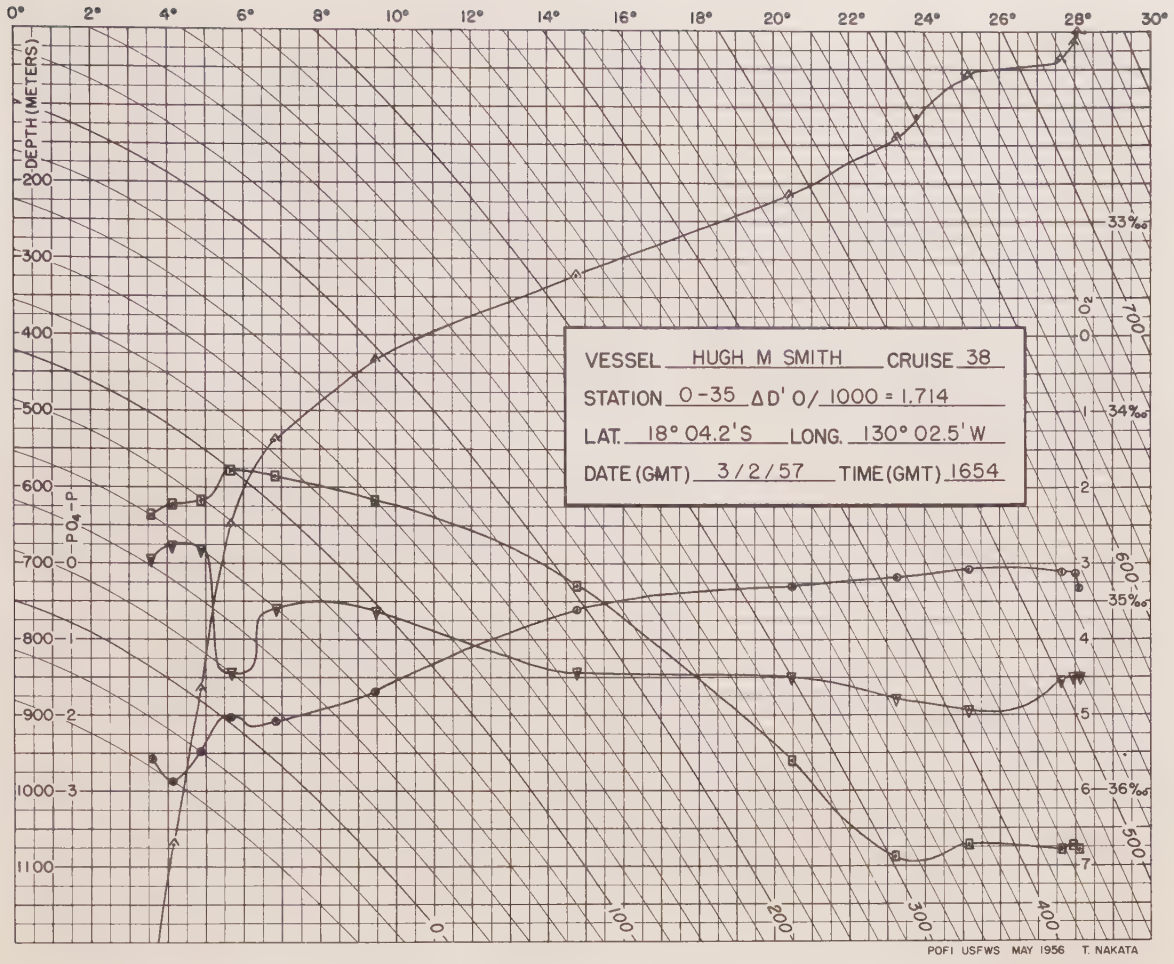
Weather: 02, cloud coverage 5. Wind: 300°, 02 kt. Sea: < 1 ft. Wire angle: < 05°.
BT slide: 174. Dry bulb: 81.9°F. Wet bulb: 75.2°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.99	35.84	482.4	4.50	0.33
16	28.15	36.15	465.0	4.52	0.33
36	28.16	36.17	464.0	4.54	0.29
57	25.36	36.13	382.0	5.12	0.32
130	23.21	36.42	299.5	4.60	0.30
213	21.04	36.06	267.4	4.33	0.33
320	14.10	34.85	195.2	3.73	0.79
320	14.05	34.85	194.3	-	-
431	8.50	34.47	125.7	2.06	2.27
536	6.82	34.47	102.2	2.25	2.42
647	6.05	34.51	89.7	2.38	2.37
861	4.98	34.51	77.1	2.55	2.42
1068	4.21	34.52	68.7	2.55	2.78
1274	3.65	34.54	61.5	2.68	2.61


VESSEL HUGH M SMITH CRUISE 38
STATION 0-34 ΔD' O/ 1000 = 1.709
LAT. 16° 29' S LONG. 130° 03.1' W
DATE(GMT) 3/2/57 TIME(GMT) 0429
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

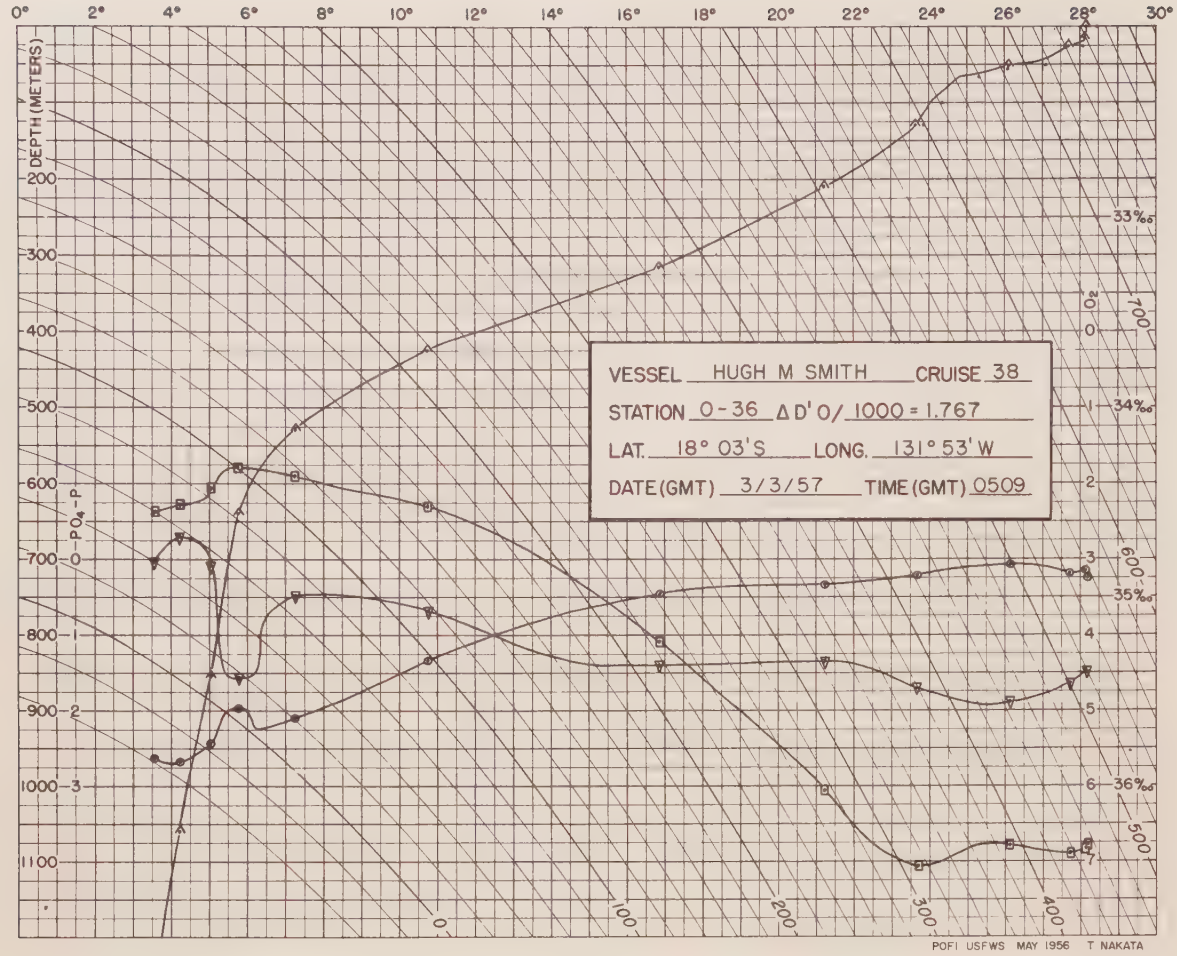
Weather: 15, cloud coverage 3. Wind: 310°, 05 kt. Sea: < 1 ft. Wire angle: 10°.
BT slide: 178. Dry bulb: 81.2°F. Wet bulb: 73.1°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.52	36.08	481.9	4.60	0.33
10	28.28	36.09	473.8	4.58	0.25
21	28.14	36.09	469.3	4.55	0.33
41	26.54	36.27	407.0	5.08	0.25
125	23.29	36.42	302.0	4.52	0.22
215	21.09	36.02	271.7	4.41	0.25
322	15.80	35.08	213.7	4.41	0.45
435	9.80	34.51	142.5	2.45	2.07
542	7.01	34.43	107.7	2.57	2.32
654	5.92	34.47	91.0	2.51	2.47
871	4.98	34.51	77.0	2.31	2.52
1079	4.24	34.54	67.3	2.10	2.82
1288	3.62	34.56	59.8	2.38	2.79


VESSEL HUGH M SMITH CRUISE 38
STATION 0-35 ΔD' O/ 1000 = 1.714
LAT. 18° 04.2'S LONG. 130° 02.5' W
DATE (GMT) 3/2/57 TIME (GMT) 1654
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

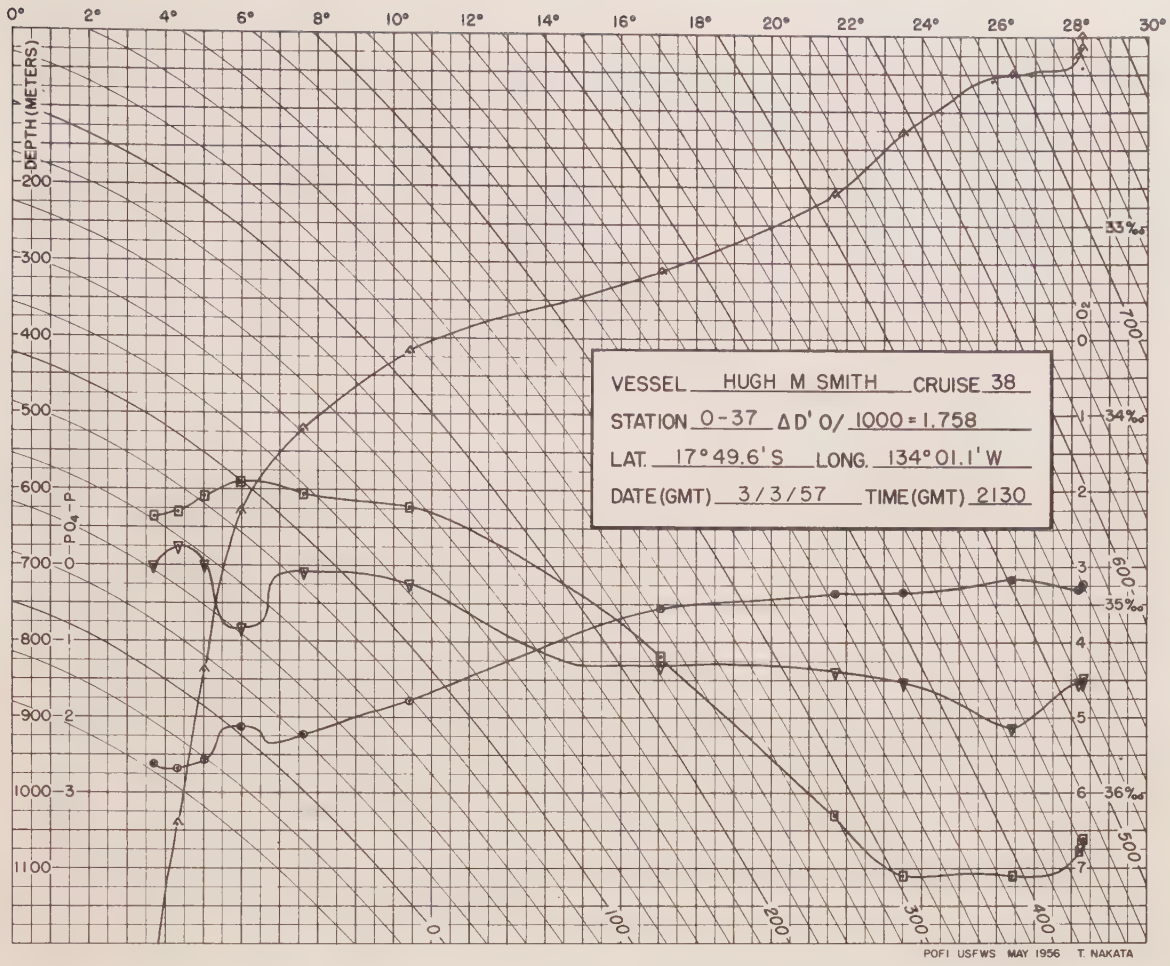
Weather: 02, cloud coverage 2. Wind: 100°, 07 kt. Sea: < 1 ft. Wire angle: < 05°.
BT slide: 180. Dry bulb: 83.0°F. Wet bulb: 79.4°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.10	36.31	452.0	4.47	0.33
15	27.95	36.29	448.7	4.50	0.14
36	27.64	36.31	438.0	4.54	0.10
57	25.18	36.29	365.1	4.93	0.06
141	23.26	36.35	305.8	4.76	0.18
216	20.46	35.84	268.6	4.50	0.30
322	14.80	34.92	204.2	4.43	0.62
434	9.47	34.47	140.3	3.63	1.67
539	6.86	34.34	112.2	3.60	2.07
650	5.68	34.31	100.2	4.44	2.02
865	4.90	34.47	79.3	2.80	2.47
1070	4.15	34.49	70.0	2.76	2.86
1276	3.59	34.54	60.9	2.93	2.56


VESSEL HUGH M SMITH CRUISE 38
STATION 0-36 Δ D' O/ 1000 = 1.767
LAT. 18° 03' S LONG. 131° 53' W
DATE (GMT) 3/3/57 TIME (GMT) 0509
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

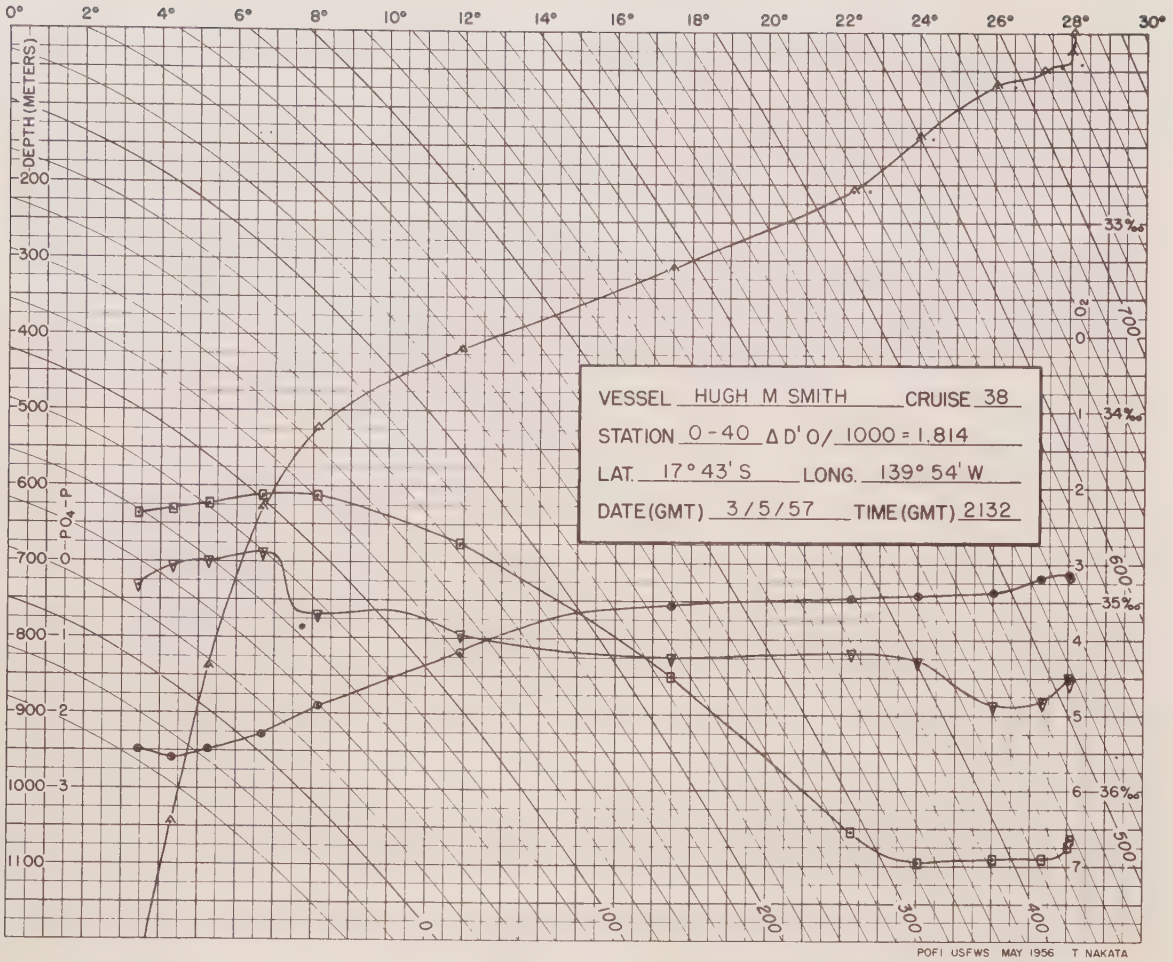
Weather: 20, cloud coverage 3. Wind: 300°, 17 kt. Sea: 3-5 ft. Wire angle: 15°.
BT slide: 184. Dry bulb: 81.3°F. Wet bulb: 74.4°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.20	36.31	455.1	4.50	0.25
15	28.14	36.33	452.0	4.49	0.14
25	27.72	36.35	437.3	4.63	0.18
51	26.12	36.31	391.4	4.87	0.06
128	23.67	36.42	312.2	4.70	0.21
210	21.25	36.02	275.8	4.34	0.33
314	16.87	35.23	226.4	4.39	0.45
424	10.78	34.52	157.7	3.65	1.32
529	7.27	34.36	116.3	3.47	2.07
639	5.78	34.31	101.3	4.55	1.97
853	5.04	34.42	84.6	3.07	2.42
1059	4.22	34.51	69.3	2.69	2.66
1267	3.56	34.54	60.8	3.04	2.61


VESSEL HUGH M SMITH CRUISE 38
STATION 0-37 ΔD' O/ 1000 = 1.758
LAT. 17°49.6'S LONG. 134°01.1'W
DATE (GMT) 3/3/57 TIME (GMT) 2130
DEPTH (METERS)
-PO4-P
POFI USFWS MAY 1956 T. NAKATA

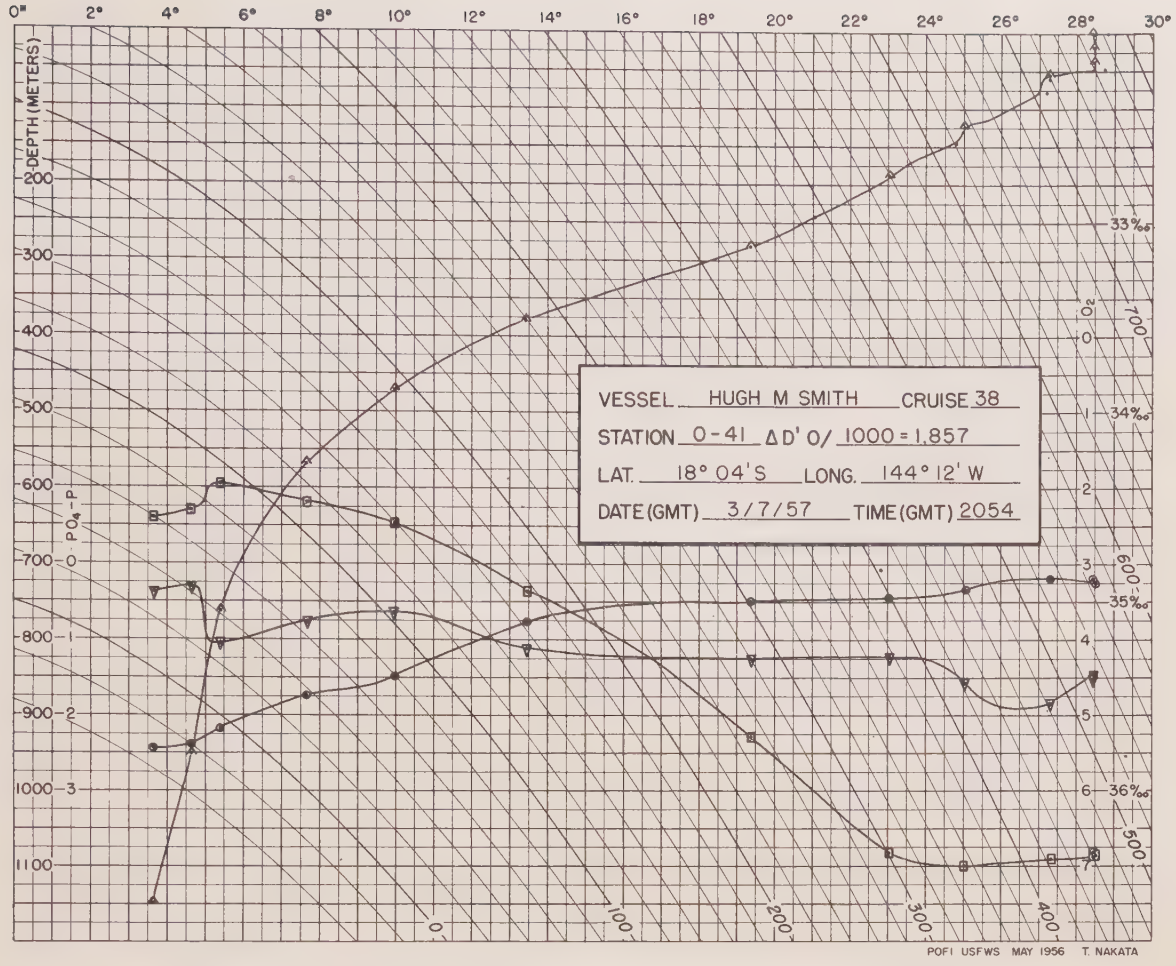
Weather: 51, cloud coverage 9. Wind: 330°, 17 kt. Sea: 3-5 ft. Wire angle: 14°.
BT slide: 189. Dry bulb: 80.6°F. Wet bulb: 76.7°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	28.30	36.24	463.4	4.47	0.22
15	28.29	36.26	461.7	4.54	0.25
26	28.20	36.31	455.1	4.54	0.29
51	26.40	36.44	390.6	5.12	0.14
128	23.50	36.44	306.0	4.52	0.33
210	21.69	36.13	279.3	4.37	0.33
313	17.08	35.28	227.7	4.29	0.55
419	10.42	34.49	154.0	3.24	1.77
522	7.62	34.42	116.7	3.06	2.22
629	5.98	34.36	99.7	3.81	2.12
838	5.04	34.43	83.7	2.98	2.56
1041	4.32	34.51	70.4	2.75	2.67
1247	3.70	34.54	62.0	3.01	2.61


VESSEL HUGH M SMITH CRUISE 38
STATION 0-40 ΔD' O/ 1000 = 1.814
LAT. 17° 43' S LONG. 139° 54' W
DATE (GMT) 3/5/57 TIME (GMT) 2132
DEPTH (METERS)
PO4-P
POF I USFWS MAY 1956 T NAKATA

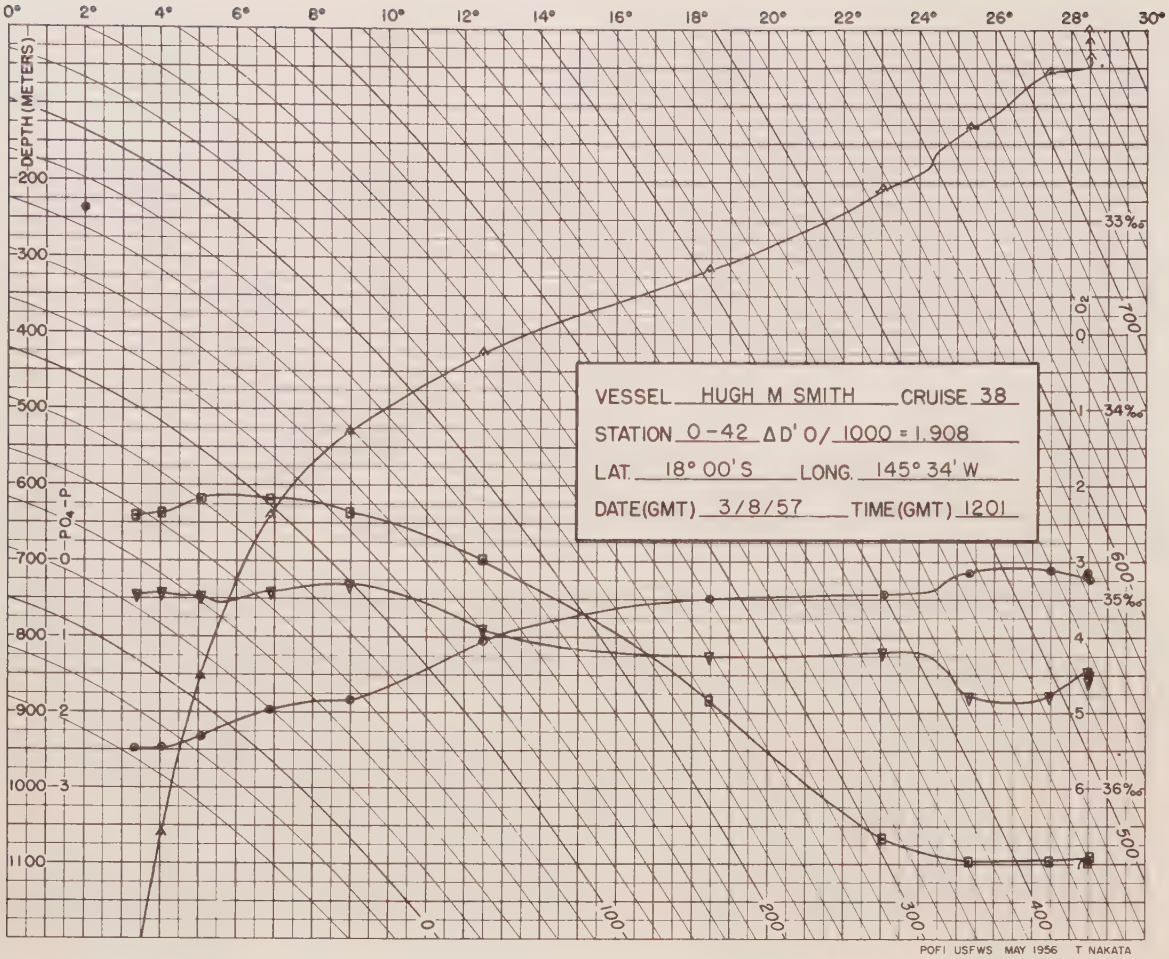
Weather: 01, cloud coverage 5. Wind: 350°, 19 kt. Sea: 3-5 ft. Wire angle: 15°.
BT slide: 201. Dry bulb: 82.9°F. Wet bulb: 76.6°F. Barometric pressure: 1009 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.06	36.26	454.8	4.55	0.14
25	28.02	36.29	451.0	4.50	0.13
50	27.32	36.36	423.9	4.80	0.18
70	26.02	36.36	385.0	4.85	0.33
137	24.01	36.38	325.0	4.30	0.41
209	22.26	36.22	288.0	4.17	0.45
312	17.50	35.39	229.1	4.25	0.55
420	11.92	34.70	164.5	3.96	1.17
523	8.18	34.45	122.3	3.68	1.87
630	6.70	34.45	102.1	2.86	2.27
840	5.28	34.49	82.0	2.97	2.47
1044	4.35	34.51	70.7	3.04	2.56
1252	3.44	34.54	59.7	3.30	2.47



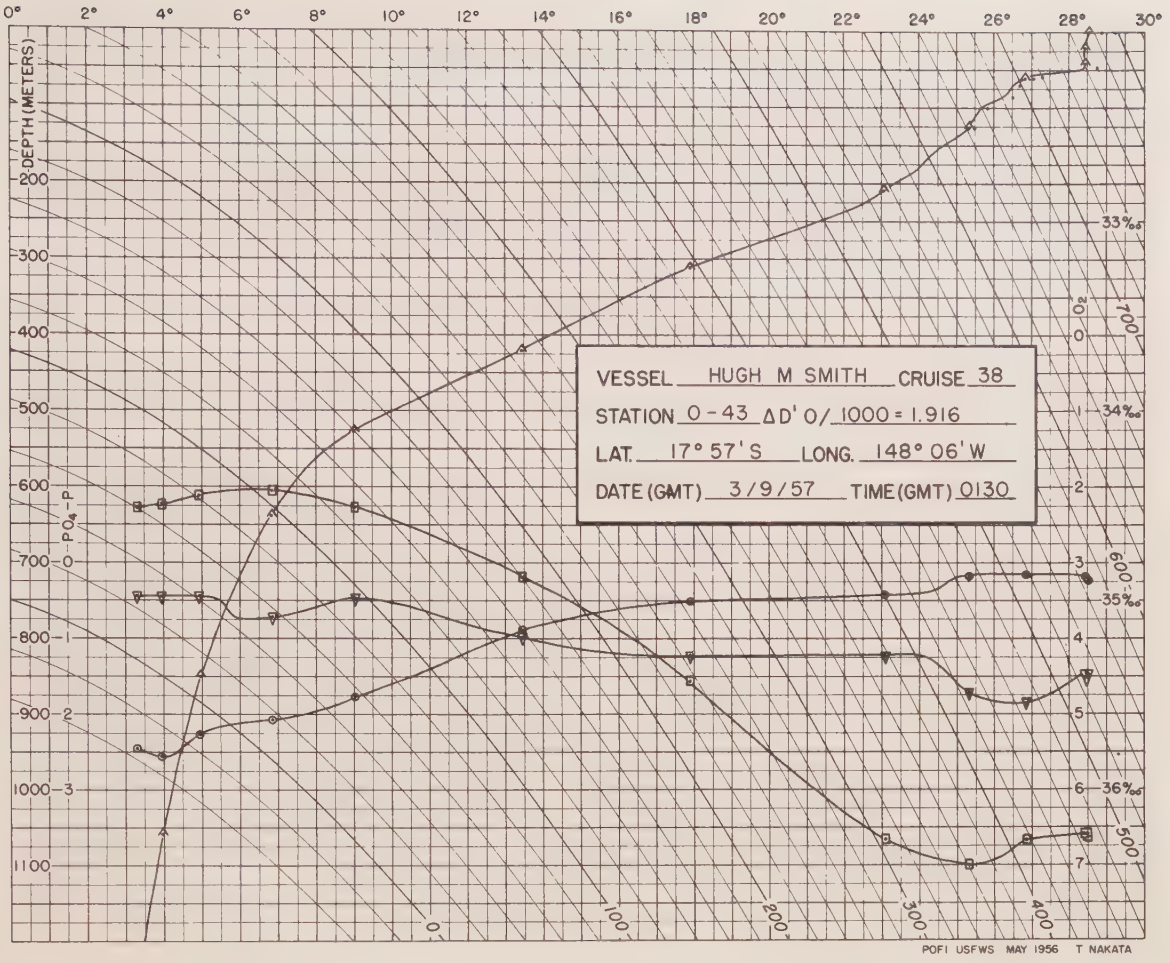
Weather: 02, cloud coverage 8. Wind: 320°, 22 kt. Sea: 5-8 ft. Wire angle: 30°.
BT slide: 207. Dry bulb: 80.8°F. Wet bulb: 75.2°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.44	36.35	460.3	4.56	0.18
18	28.45	36.33	462.0	4.50	0.21
37	28.48	36.35	461.7	4.49	0.25
55	27.31	36.36	423.8	4.83	0.18
124	25.03	36.40	352.9	4.56	0.33
189	23.07	36.33	302.3	4.22	0.45
281	19.38	35.71	250.7	4.23	0.48
378	13.47	34.94	176.1	4.11	0.76
471	9.96	34.58	139.9	3.62	1.47
569	7.65	34.47	113.5	3.74	1.72
761	5.40	34.38	91.7	4.03	2.15
950	4.62	34.51	73.6	3.30	2.37
1148	3.63	34.56	59.9	3.36	2.42


VESSEL HUGH M SMITH CRUISE 38
STATION 0-42 ΔD' O/ 1000 = 1.908
LAT. 18° 00' S LONG. 145° 34' W
DATE(GMT) 3/8/57 TIME(GMT) 1201
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

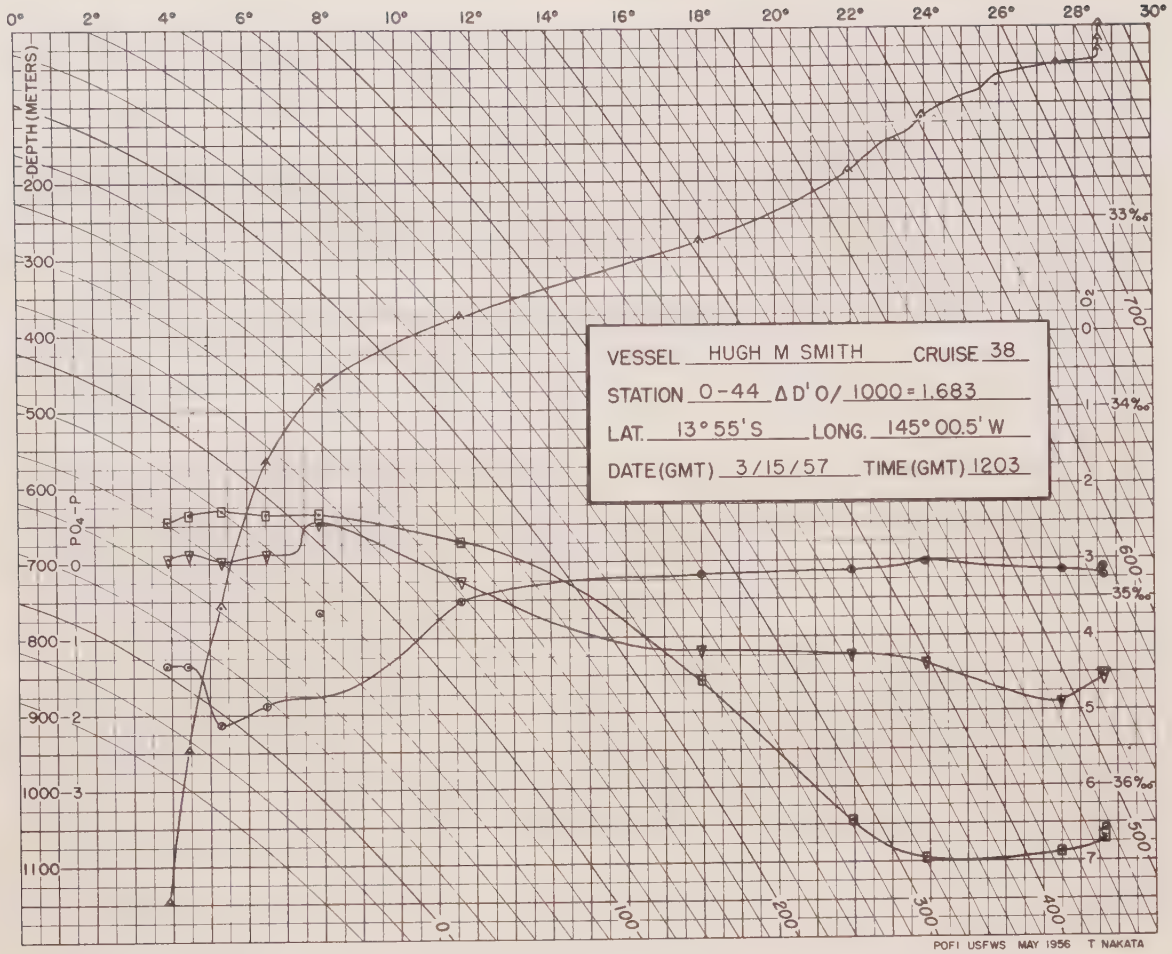
Weather: 01, cloud coverage 6. Wind: 280°, 15 kt. Sea: 5-8 ft. Wire angle: 15°.
BT slide: 210. Dry bulb: 82.2°F. Wet bulb: 76.5°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.49	36.38	459.4	4.46	0.14
15	28.49	36.38	459.4	4.60	0.18
36	28.54	36.36	462.6	4.48	0.21
56	27.44	36.38	426.7	4.76	0.10
129	25.36	36.38	364.0	4.76	0.14
212	23.05	36.26	306.8	4.20	0.41
316	18.45	35.53	241.4	4.24	0.48
426	12.48	34.79	168.3	3.90	1.07
531	8.96	34.54	127.3	3.31	1.82
641	6.89	34.47	102.8	3.40	1.97
854	5.07	34.47	81.1	3.46	2.32
1062	4.02	34.54	65.1	3.42	2.48
1274	3.38	34.56	57.5	3.44	2.49


VESSEL HUGH M SMITH CRUISE 38
STATION 0-43 ΔD' O/ 1000 = 1.916
LAT. 17° 57' S LONG. 148° 06' W
DATE (GMT) 3/9/57 TIME (GMT) 0130
DEPTH (METERS)
PO4-P
O2
POFI USFWS MAY 1956 T NAKATA

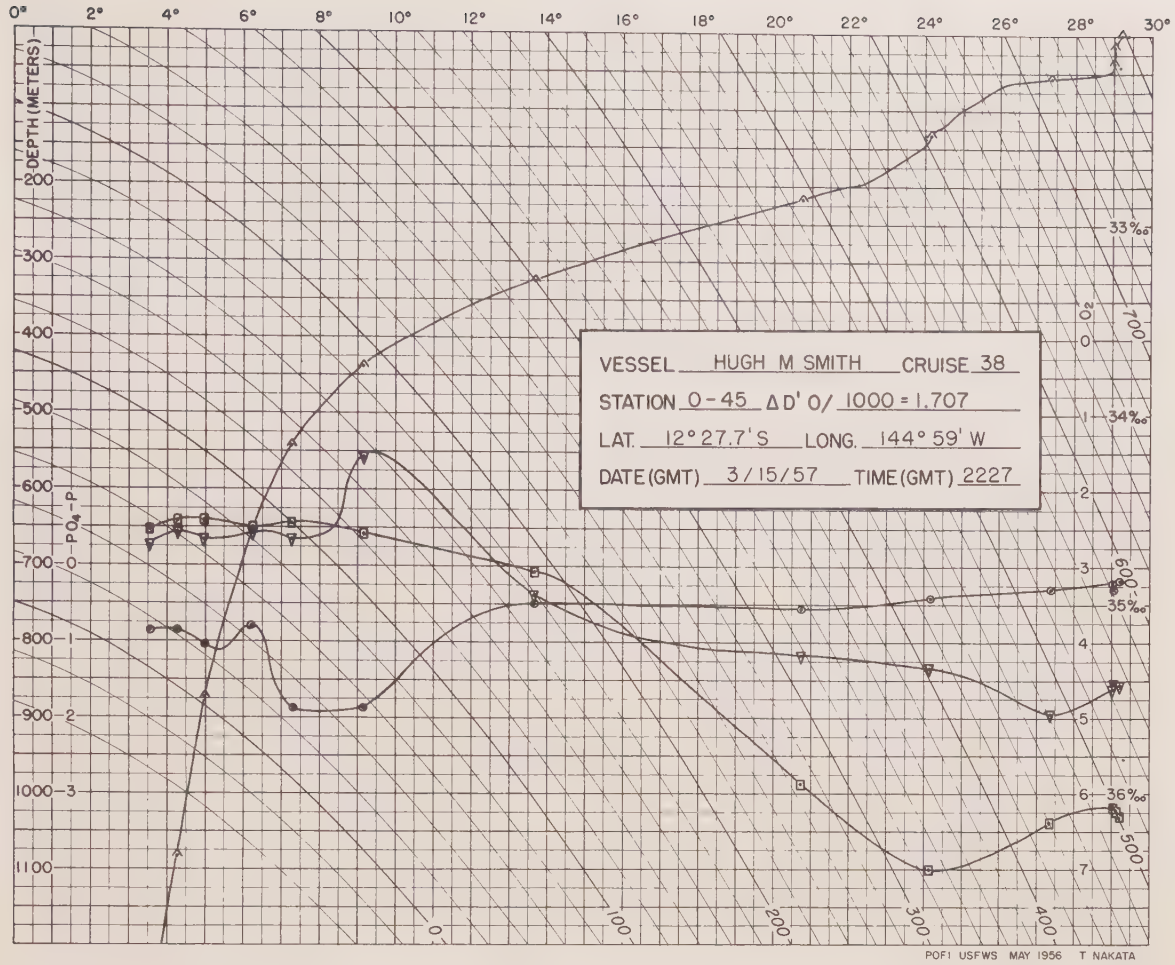
Weather: 51, cloud coverage 8. Wind: 300°, 12 kt. Sea: 3-5 ft. Wire angle: 15°.
BT slide: 214. Dry bulb: 82.5°F. Wet bulb: 79.1°F. Barometric pressure: 1008 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl. /ton	O_2, ml. /L.	PO_4-P, µg at. /L.
0	28.52	36.26	469.0	4.48	0.21
20	28.42	36.24	467.2	4.49	0.17
40	28.44	36.24	468.2	4.48	0.17
61	26.83	36.27	415.7	4.85	0.13
126	25.33	36.40	361.7	4.71	0.17
209	23.08	36.26	307.3	4.21	0.41
312	17.90	35.43	235.5	4.23	0.52
421	13.46	34.88	180.4	3.99	0.90
526	9.05	34.51	130.8	3.46	1.77
636	6.84	34.42	106.2	3.71	2.07
850	4.93	34.45	81.2	3.45	2.29
1058	3.96	34.49	68.2	3.46	2.57
1270	3.31	34.51	60.8	3.44	2.47



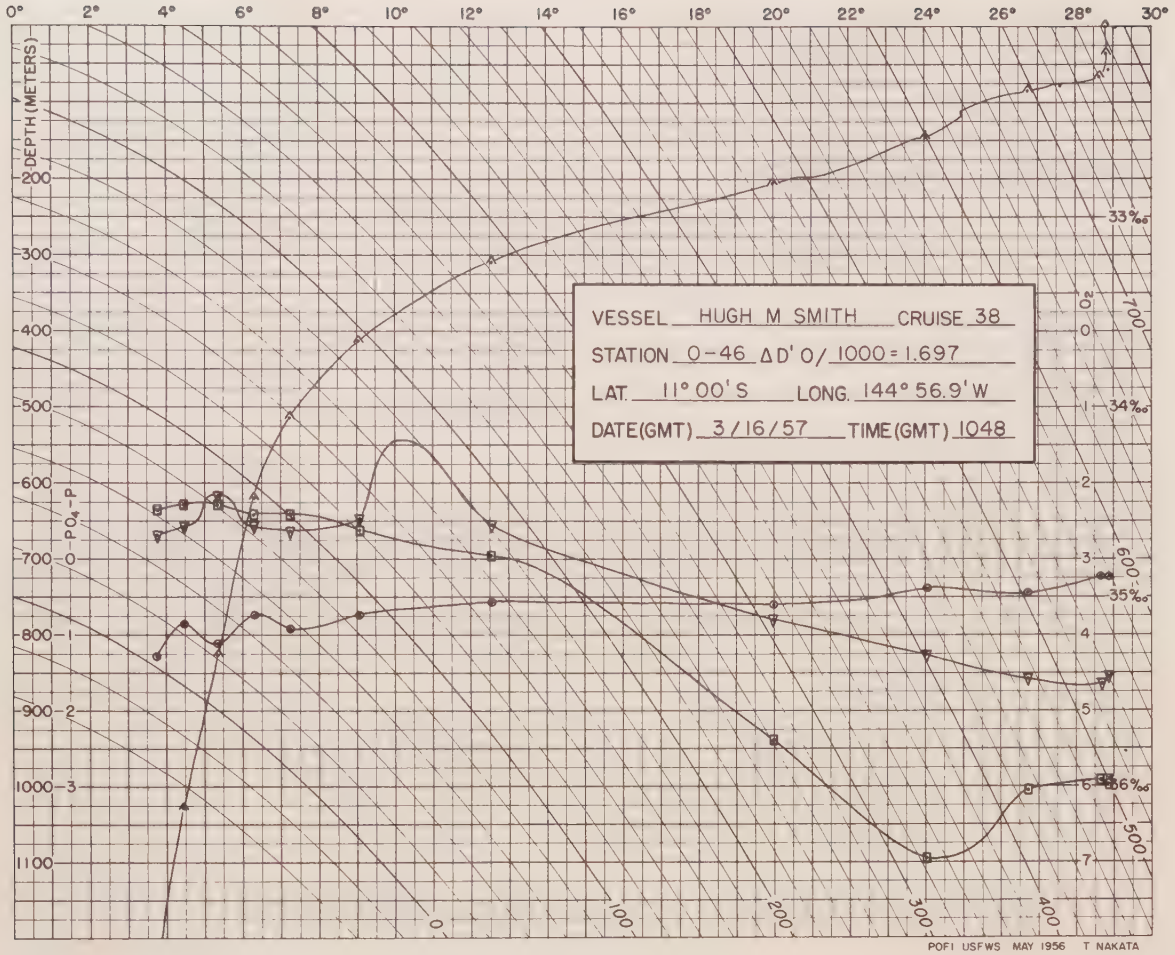
Weather: 02, cloud coverage 7. Wind: 100°, 12 kt. Sea: 1-3 ft. Wire angle: 25°.
BT slide: 216. Dry bulb: 81.4°F. Wet bulb: 78.0°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	28.62	36.24	473.7	4.54	0.22
18	28.62	36.27	471.6	4.52	0.10
32	28.64	36.29	470.5	4.54	0.14
50	27.51	36.35	430.8	4.89	0.14
119	23.91	36.38	322.1	4.37	0.03
188	21.98	36.18	283.6	4.24	0.14
280	17.97	35.43	237.0	4.19	0.18
377	11.62	34.69	160.0	3.24	0.52 P
470	7.89	34.54	111.5	2.46	0.67
567	6.52	34.54	93.2	2.88	1.87
759	5.29	34.52	80.0	2.98	2.12
949	4.42	34.54	69.2	2.88	0.85
1148	3.88	34.58	60.7	2.91	0.85


VESSEL HUGH M SMITH CRUISE 38
STATION 0-45 ΔD' O/ 1000 = 1.707
LAT. 12° 27.7' S LONG. 144° 59' W
DATE (GMT) 3/15/57 TIME (GMT) 2227
DEPTH (METERS)
O - PO4 - P
POF1 USFWS MAY 1956 T NAKATA

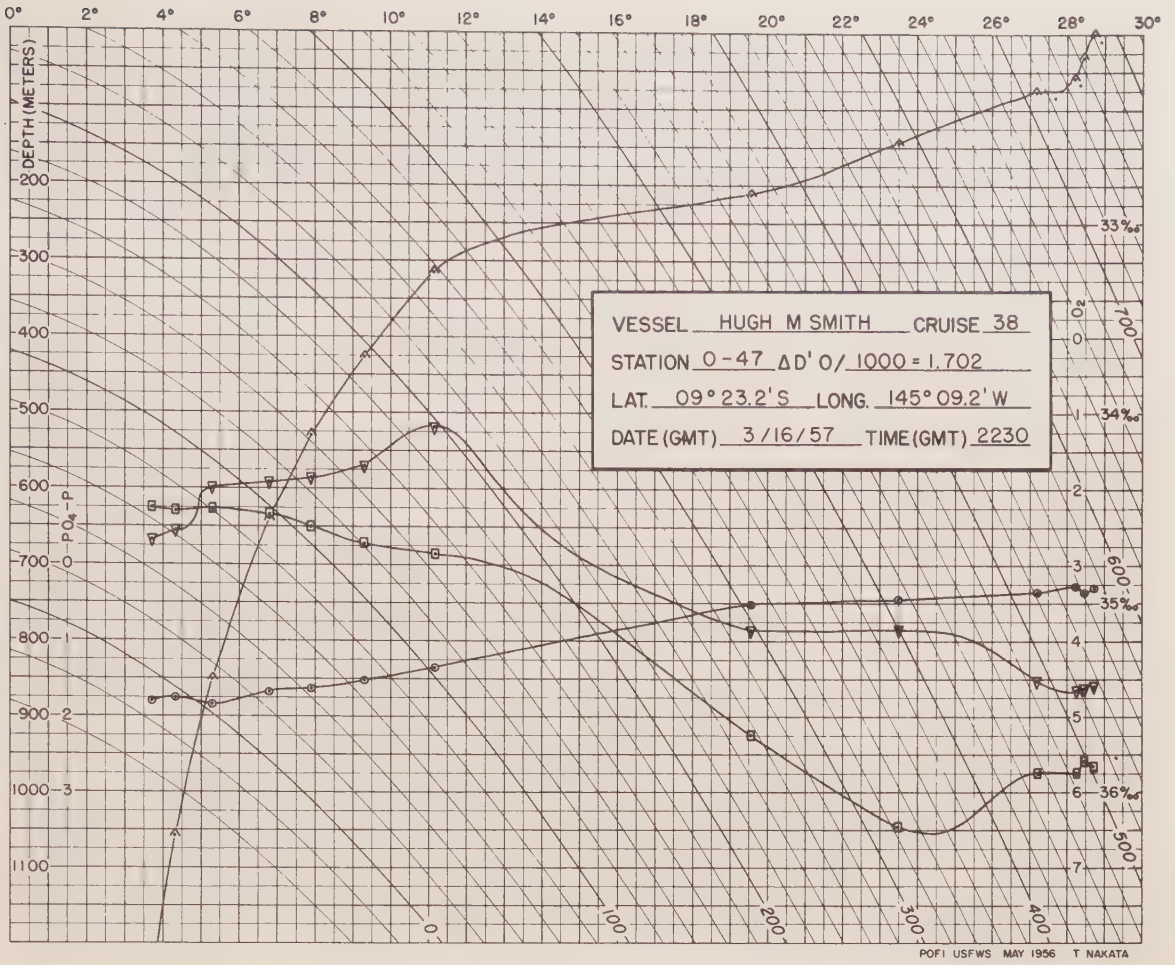
Weather: 02, cloud coverage 7. Wind: 090°, 08 kt. Sea: 1-3 ft. Wire angle: 05°.
BT slide: 219. Dry bulb: 85.0°F. Wet bulb: 79.0°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	29.22	36.13	500.3	4.56	0.18
16	29.06	36.09	498.5	4.55	0.29
37	29.02	36.08	498.0	4.60	0.21
57	27.37	36.15	441.0	4.96	0.29
132	24.18	36.40	328.2	4.34	0.41
217	20.76	35.95	268.4	4.17	0.55
324	13.67	34.83	187.9	3.38	0.48
436	9.15	34.63	123.5	1.56	1.87
542	7.27	34.58	99.8	2.63	1.87
654	6.22	34.60	84.9	2.55	0.79
871	4.98	34.56	73.3	2.65	1.02
1081	4.24	34.56	65.7	2.56	0.85
1291	3.56	34.61	55.4	2.72	0.85


VESSEL HUGH M SMITH CRUISE 38
STATION 0-46 ΔD' O/ 1000 = 1.697
LAT. 11° 00' S LONG. 144° 56.9' W
DATE(GMT) 3/16/57 TIME(GMT) 1048
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

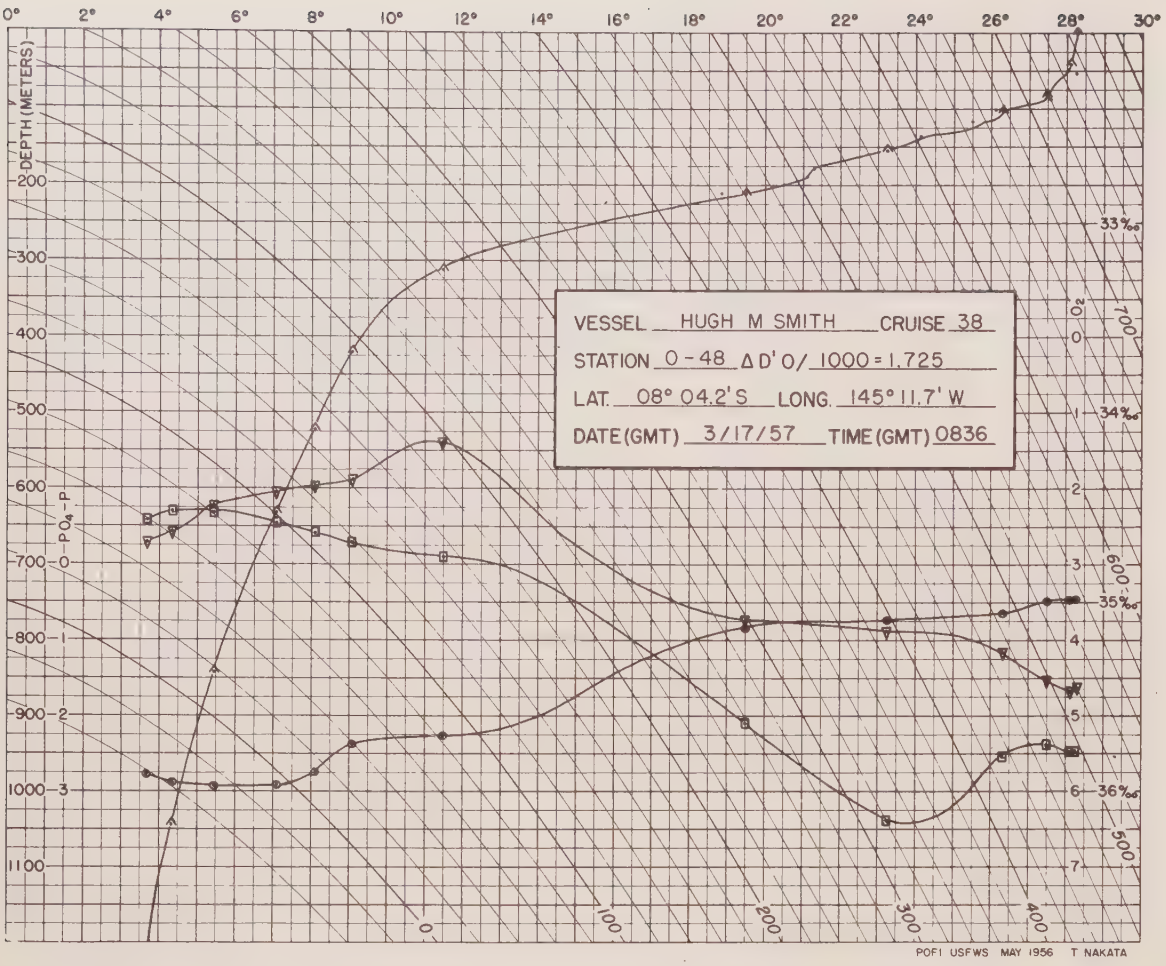
Weather: 01, cloud coverage 3. Wind: 090°, 08 kt. Sea: 1-3 ft. Wire angle: 15°.
BT slide: 222. Dry bulb: 82.3°F. Wet bulb: 76.4°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.82	35.99	497.8	4.56	NG
35	28.83	35.97	499.7	4.56	0.22
65	28.66	35.97	494.3	4.63	0.22
85	26.73	36.02	431.1	4.59	0.45
146	24.02	36.38	325.2	4.26	0.37
206	19.96	35.75	262.2	3.79	0.60
307	12.56	34.78	170.5	2.53	0.57
412	9.04	34.65	120.3	2.48	0.71
513	7.22	34.56	100.7	2.61	0.90
618	6.30	34.56	88.9	2.56	0.71
825	5.34	34.51	81.2	2.17	1.12
1026	4.42	34.51	71.4	2.55	0.85
1232	3.78	34.54	62.7	2.68	1.27


DEPTH (METERS)
VESSEL HUGH M SMITH CRUISE 38
STATION 0-47 ΔD' O/ 1000 = 1.702
LAT. 09° 23.2' S LONG. 145° 09.2' W
DATE (GMT) 3/16/57 TIME (GMT) 2230
POFI USFWS MAY 1956 T NAKATA

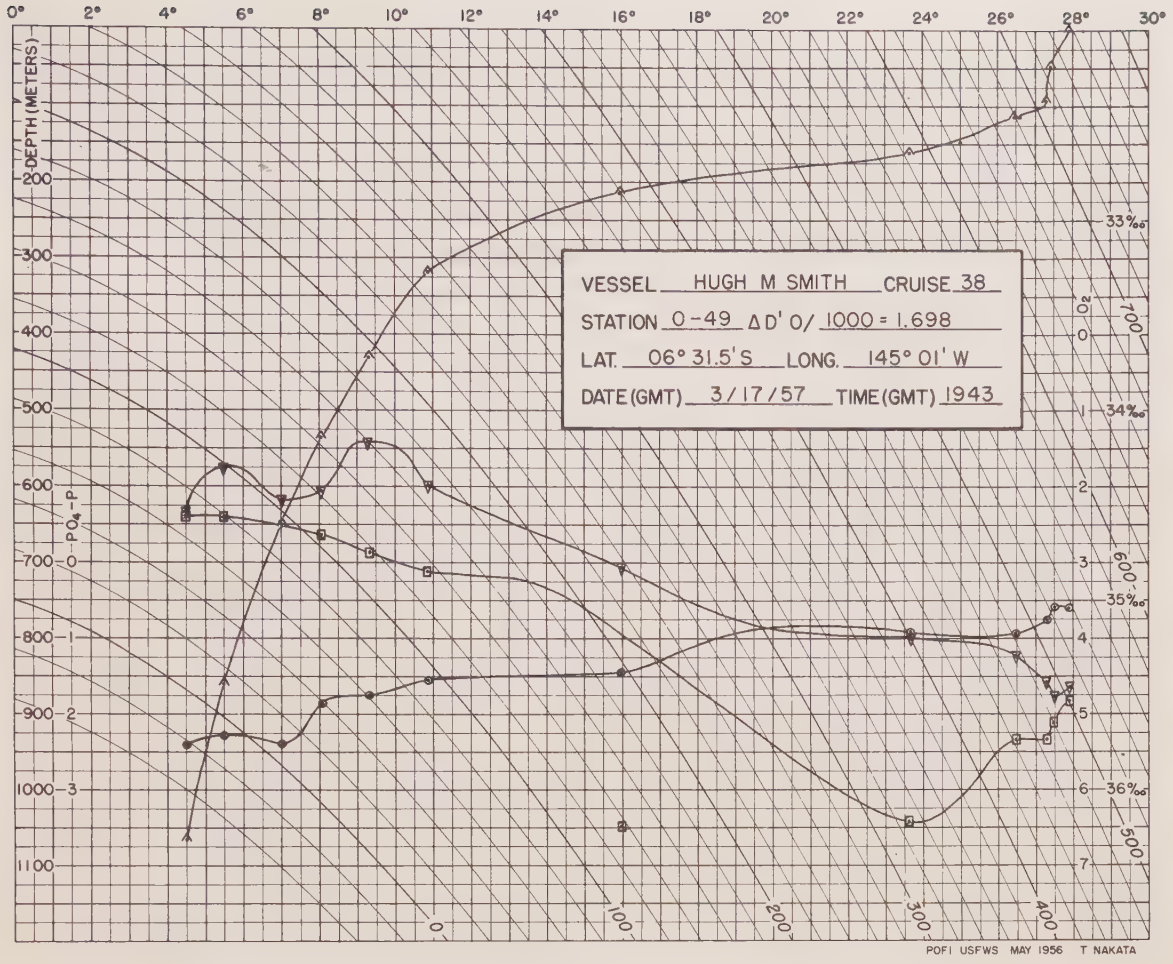
Weather: 02, cloud coverage 2. Wind: 050°, 09 kt. Sea: 1-3 ft. Wire angle: 10°.
BT slide: 225. Dry bulb: 85.4°F. Wet bulb: 76.8°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	28.72	35.86	504.3	4.60	0.30
30	28.44	35.84	496.7	4.62	0.35
56	28.24	35.90	486.2	4.66	0.28
77	27.20	35.90	453.7	4.52	0.35
144	23.48	36.18	324.5	3.86	0.46
212	19.58	35.70	256.7	3.86	0.51
316	11.14	34.74	148.0	1.19	1.35
426	9.30	34.69	121.3	1.70	1.52
530	7.87	34.60	106.8	1.85	1.64
639	6.80	34.54	96.7	1.92	1.68
852	5.28	34.51	80.6	2.00	1.81
1057	4.34	34.52	69.8	2.56	1.76
1266	3.68	34.54	61.8	2.67	1.80



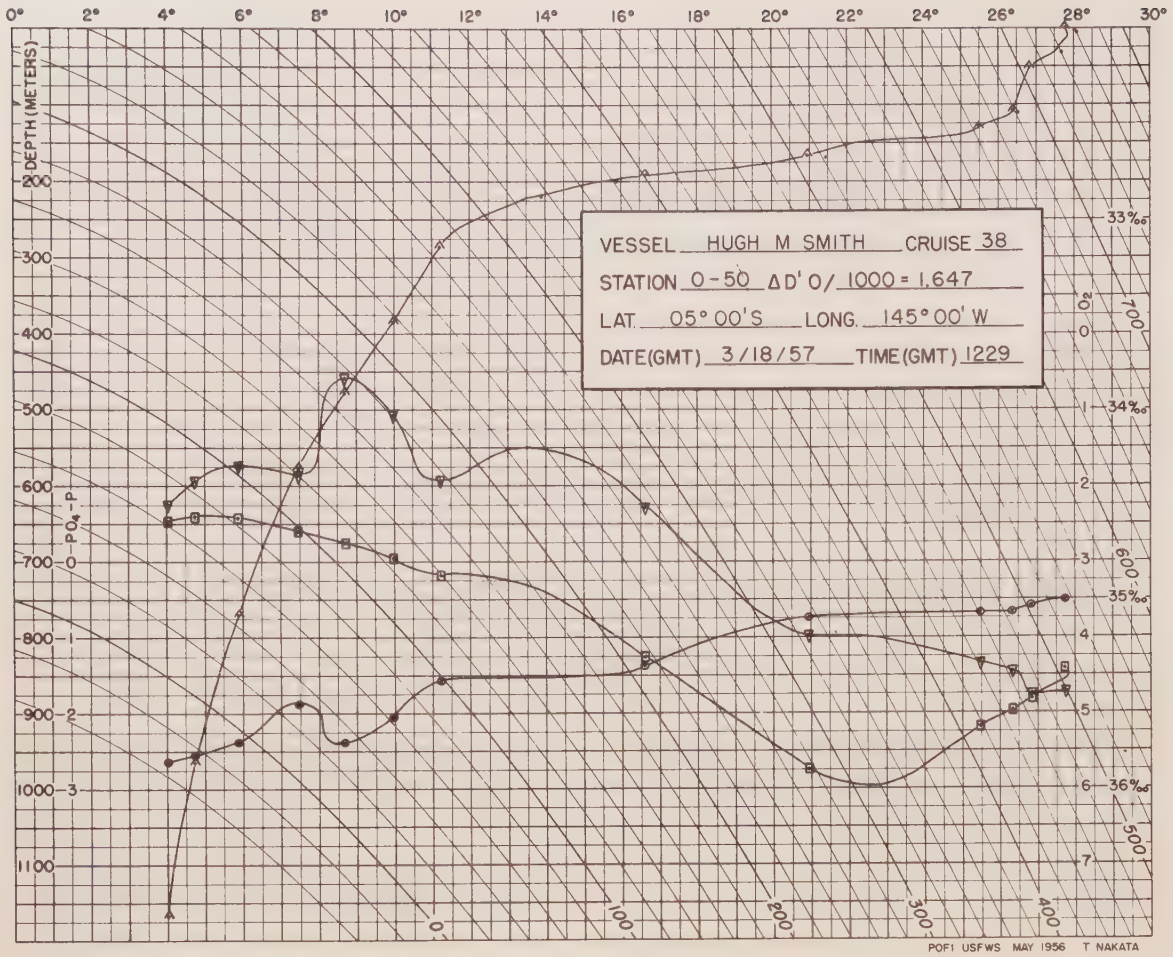
Weather: 01, cloud coverage 1. Wind: 010°, 05 kt. Sea: 1-3 ft. Wire angle: 14°.
BT slide: 229. Dry bulb: 81.5°F. Wet bulb: 76.3°F. Barometric pressure: 1012 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, μg at./L.
0	28.29	35.79	495.7	4.63	0.49
41	28.12	35.79	490.2	4.68	0.49
82	27.50	35.75	473.9	4.55	0.49
103	26.32	35.82	432.8	4.18	0.65
154	23.24	36.15	319.8	3.89	0.74
211	19.50	35.64	258.9	3.75	0.83
312	11.46	34.76	152.0	1.40	2.26
420	9.08	34.69	117.8	1.89	2.37
522	8.10	34.63	107.7	1.98	2.74
630	7.08	34.58	97.3	2.03	2.90
841	5.42	34.52	81.4	2.21	2.91
1044	4.36	34.52	69.9	2.56	2.89
1250	3.66	34.56	60.2	2.70	2.78


VESSEL HUGH M SMITH CRUISE 38
STATION 0-49 Δ D' O/ 1000 = 1.698
LAT. 06° 31.5' S LONG. 145° 01' W
DATE (GMT) 3/17/57 TIME (GMT) 1943
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

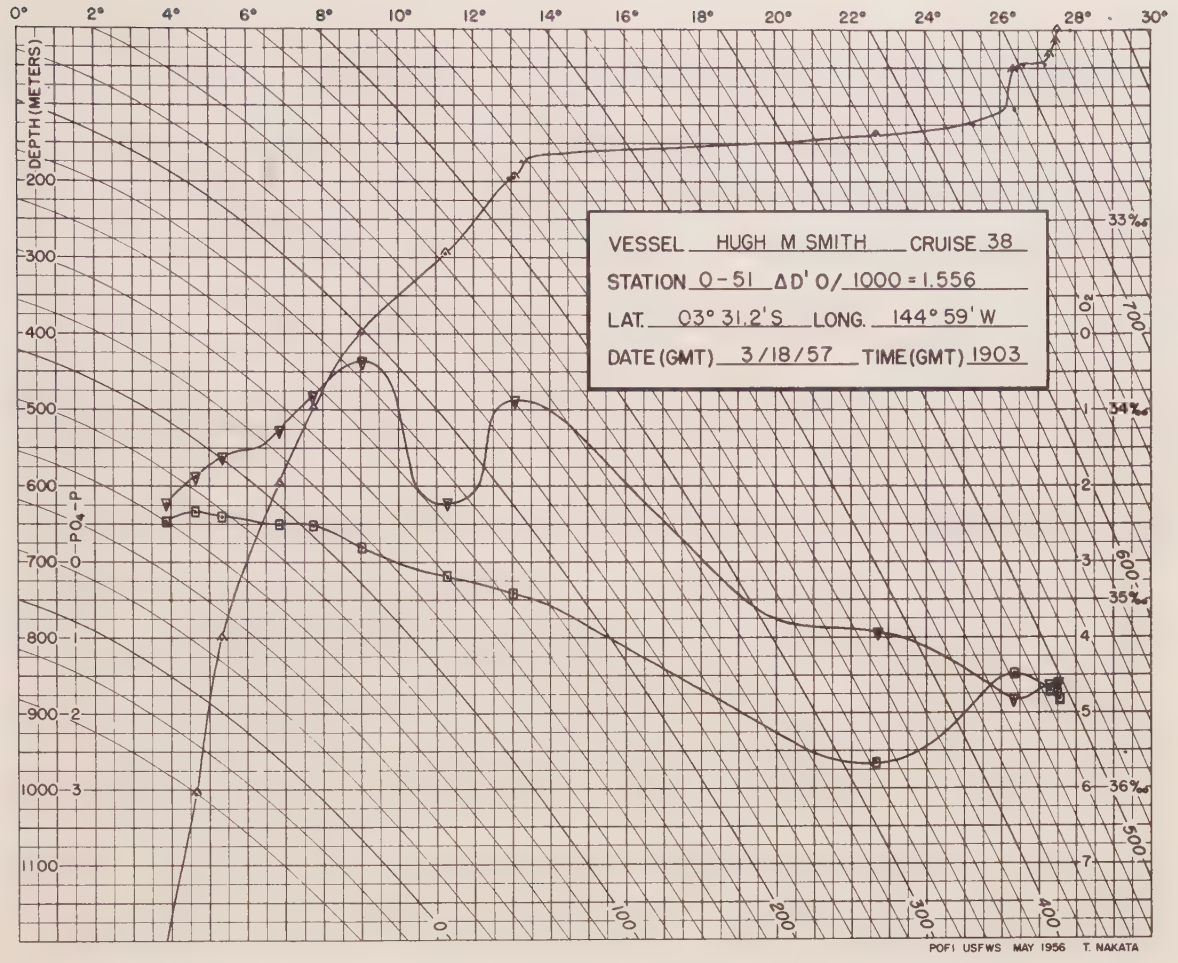
Weather: 02, cloud coverage 2. Wind: 060°, 08 kt. Sea: 1-3 ft. Wire angle: 07°.
BT slide: 231. Dry bulb: 83.2°F. Wet bulb: 76.7°F. Barometric pressure: 1013 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.90	35.53	502.2	4.63	0.59
47	27.47	35.64	480.7	4.76	0.58
93	27.30	35.73	469.0	4.59	0.74
114	26.42	35.73	442.3	4.21	0.91
161	23.65	36.17	329.8	3.98	0.92
213	15.98	36.19 P	136.7 P	3.03	1.45
319	10.88	34.85	135.2	1.98	1.54
430	9.34	34.74	118.3	1.41	1.75
535	8.06	34.65	105.7	2.05	1.86
646	7.02	34.60	95.0	2.17	2.37
860	5.48	34.56	79.1	1.75	2.29
1064	4.52	34.56	68.7	2.35	2.40
PT	-	-	-	-	-


VESSEL HUGH M SMITH CRUISE 38
STATION 0-50 ΔD' O/ 1000 = 1.647
LAT. 05° 00' S LONG. 145° 00' W
DATE(GMT) 3/18/57 TIME(GMT) 1229
DEPTH (METERS)
PO4-P
POF1 USFWS MAY 1956 T NAKATA

Weather: 02, cloud coverage 2. Wind: 090°, 12 kt. Sea: 1-3 ft. Wire angle: 25°.
BT slide: 235. Dry bulb: 81.0°F. Wet bulb: 76.7°F. Barometric pressure: 1010 mb.

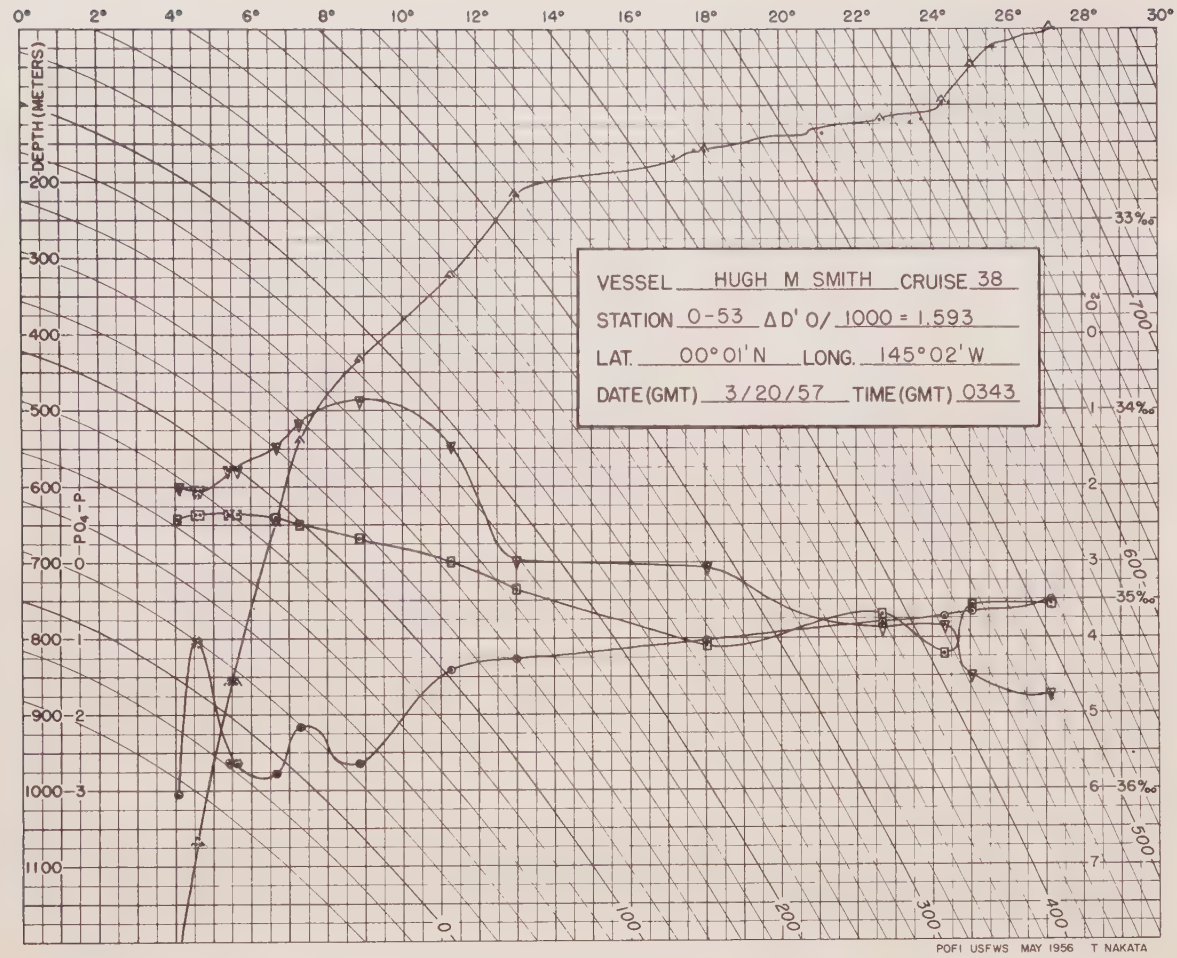
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.76	35.37	509.2	4.73	0.51
52	26.81	35.53	468.4	4.77	0.59
108	26.38	35.59	451.5	4.46	0.68
127	25.48	35.68	418.0	4.34	0.67
164	20.94	35.90	276.5	3.98	0.74
192	16.61	35.30	215.7	2.27	1.37
285	11.21	34.87	139.5	1.91	1.56
383	9.96	34.78	125.0	1.06	2.04
476	8.70	34.70	111.5	0.58	2.39
576	7.46	34.63	98.7	1.83	1.86
770	5.87	34.56	83.6	1.72	2.37
964	4.76	34.56	71.0	1.91	2.55
1167	4.02	34.58	62.2	2.25	2.61


VESSEL HUGH M SMITH CRUISE 38
STATION 0-51 ΔD' 0/1000 = 1.556
LAT. 03° 31.2'S LONG. 144° 59' W
DATE (GMT) 3/18/57 TIME (GMT) 1903
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

Weather: 01, cloud coverage 1. Wind: 090°, 13 kt. Sea: 1-3 ft. Wire angle: 27°.
BT slide: 238. Dry bulb: 83.0°F. Wet bulb: 77.3°F. Barometric pressure: 1011 mb.

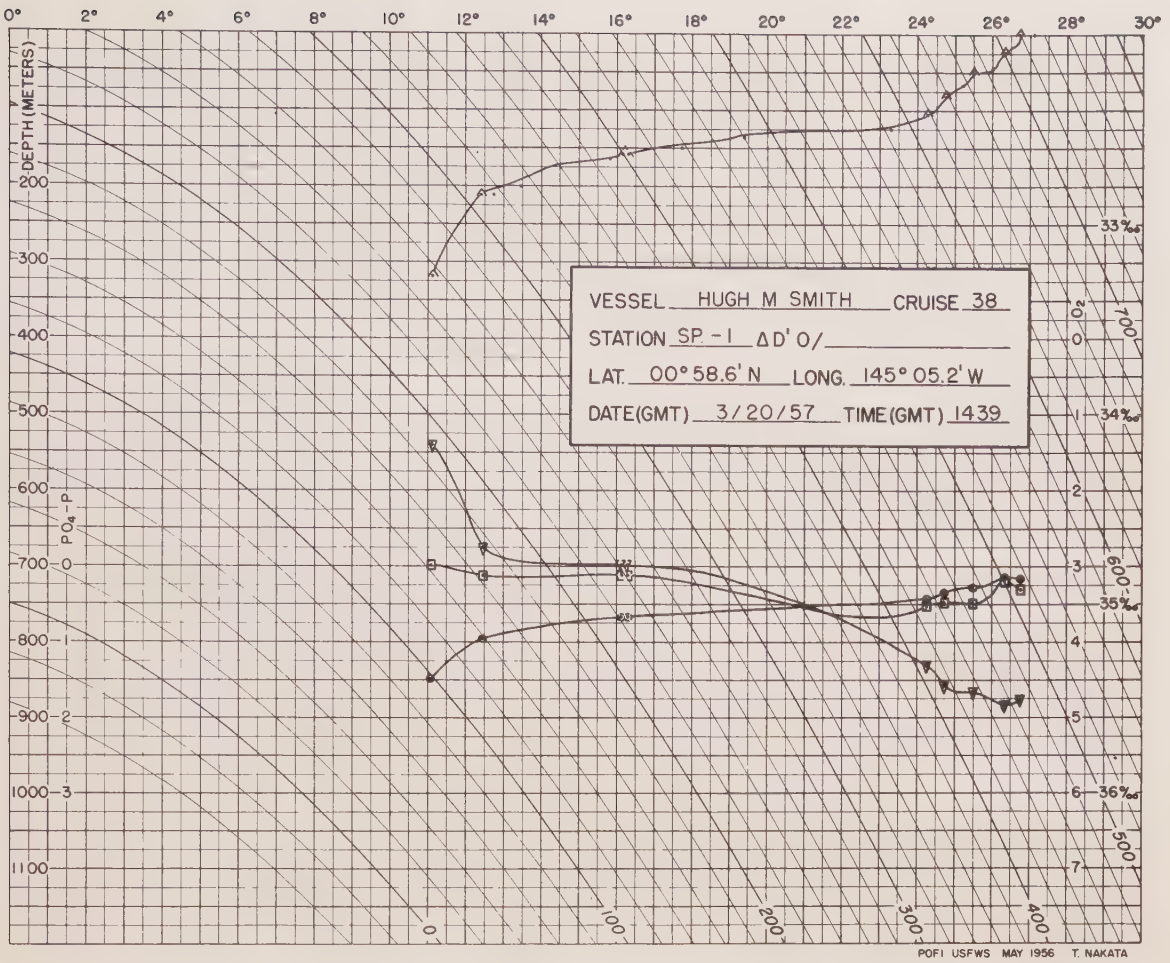
Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.56	35.52	492.2	4.64	1/
13	27.50	35.50	491.8	4.68	-
31	27.34	35.48	488.3	4.68	-
53	26.31	35.39	463.5	4.82	-
138	22.68	35.86	325.7	3.95	-
195	13.05	34.97	165.7	0.88	-
294	11.29	34.87	140.9	2.22	-
398	9.01	34.72	114.7	0.37	-
497	7.74	34.61	104.3	0.84	-
599	6.81	34.61	91.7	1.28	-
801	5.32	34.56	77.3	1.62	-
1007	4.64	34.54	71.4	1.89	-
1208	3.86	34.58	60.5	2.23	-

1/ Phosphate samples not identifiable


VESSEL HUGH M SMITH CRUISE 38
STATION 0-53 ΔD' O/ 1000 = 1.593
LAT. 00°01'N LONG. 145°02'W
DATE(GMT) 3/20/57 TIME(GMT) 0343
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

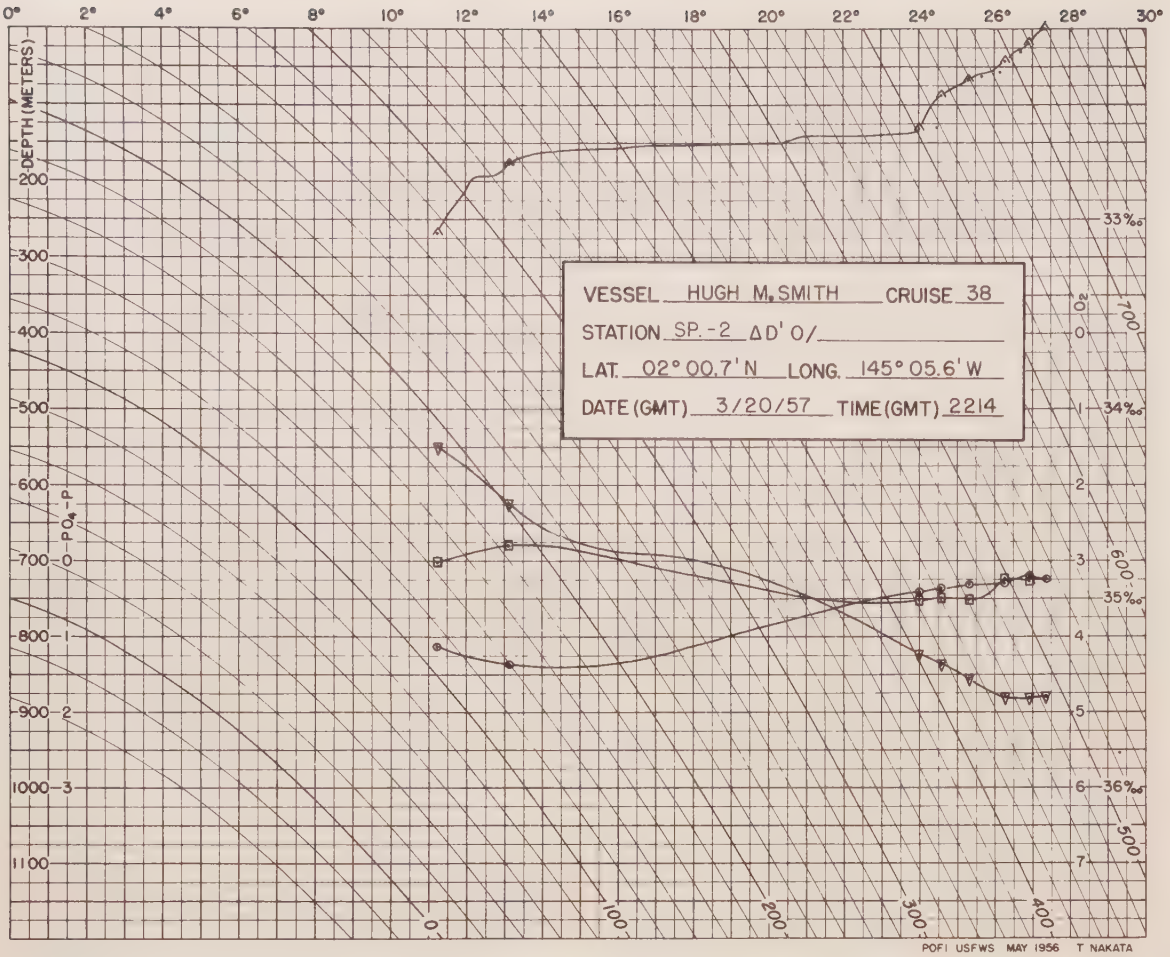
Weather: 02, cloud coverage 1. Wind: 090°, 08 kt. Sea: 1-3 ft. Wire angle: 17°.
BT slide: 245. Dry bulb: 81.4°F. Wet bulb: 76.3°F. Barometric pressure: 1009 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.18	35.01	517.2	4.75	0.51
50	25.06	35.03	452.4	4.50	0.64
95	24.32	35.28	413.2	3.84	0.72
119	22.68	35.07	382.3	3.86	0.80
159	18.02	35.23	252.7	3.06	1.04
217	13.00	34.94	167.1	2.97	1.27
323	11.28	34.79	146.5	1.48	1.41
434	8.89	34.67	116.4	0.86	2.63
540	7.30	34.60	98.9	1.19	2.16
648	6.66	34.56	93.4	1.48	2.78
857	5.61	34.54	82.4	1.79	2.63
857	5.40	34.54	79.7	-	-
1069	4.61	34.54	71.2	2.04	1.05
1069	4.56	34.54	70.6	-	-
1275	4.10	34.56	64.3	2.00	3.05


VESSEL HUGH M SMITH CRUISE 38
STATION SP.-1 ΔD' O/
LAT. 00° 58.6' N LONG. 145° 05.2' W
DATE(GMT) 3/20/57 TIME(GMT) 1439
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

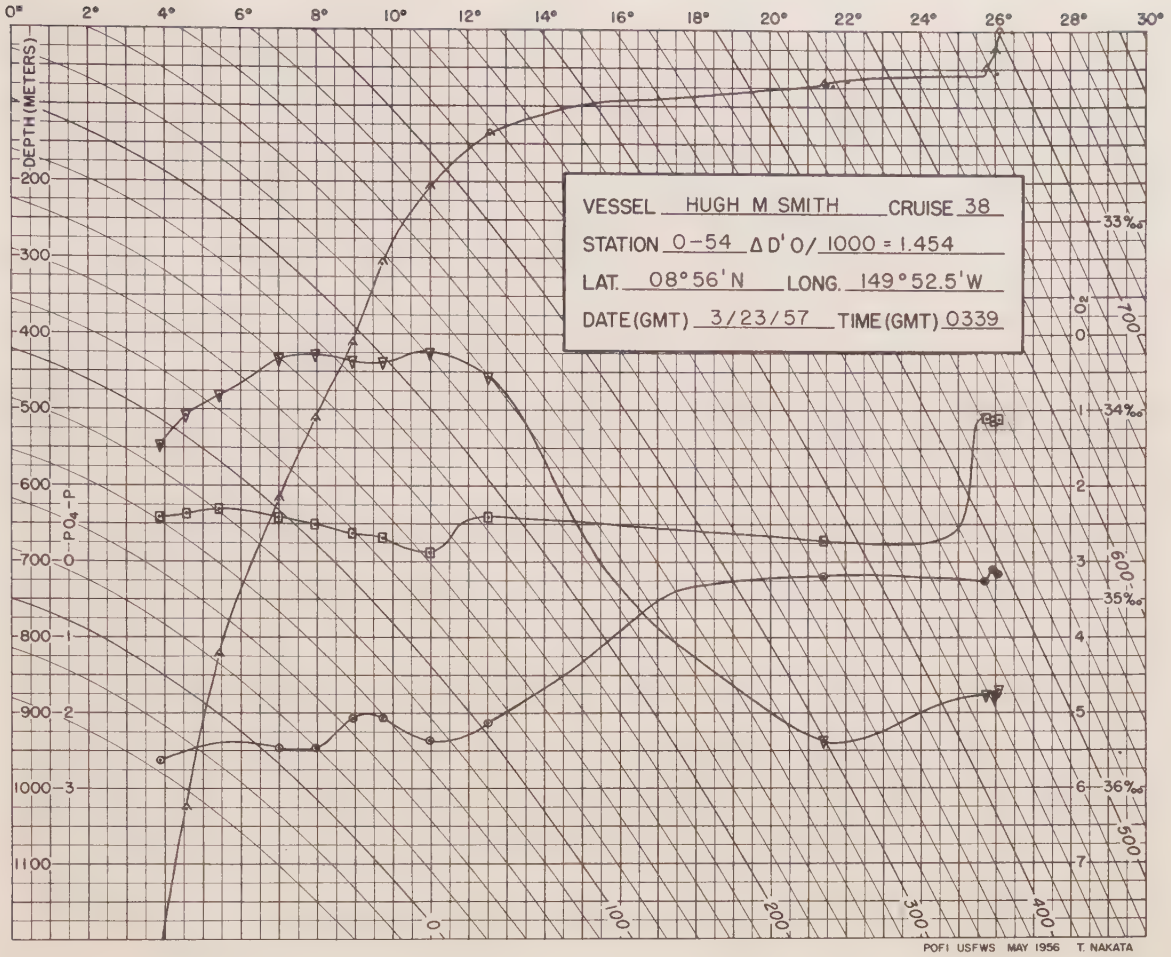
Weather: 02, cloud coverage 1. Wind: 080°, 08 kt. Sea: 1-3 ft. Wire angle: 11°.
BT slide: 249. Dry bulb: 80.2°F. Wet bulb: 76.4°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.75	34.92	510.4	4.78	0.17
24	26.32	34.87	501.2	4.84	0.18
52	25.50	34.99	468.2	4.67	0.28
81	24.76	34.97	447.8	4.57	0.35
105	24.27	35.01	430.8	4.30	0.43
158	16.18	34.85	238.8	2.99	0.67
158	16.33	34.85	242.2	-	-
211	12.44	34.85	163.2	2.75	0.96
318	11.12	34.79	143.9	1.40	1.49


VESSEL HUGH M. SMITH CRUISE 38
STATION SP.-2 ΔD' 0/
LAT. 02° 00.7' N LONG. 145° 05.6' W
DATE (GMT) 3/20/57 TIME (GMT) 2214
DEPTH (METERS)
POF1 USFWS MAY 1956 T NAKATA

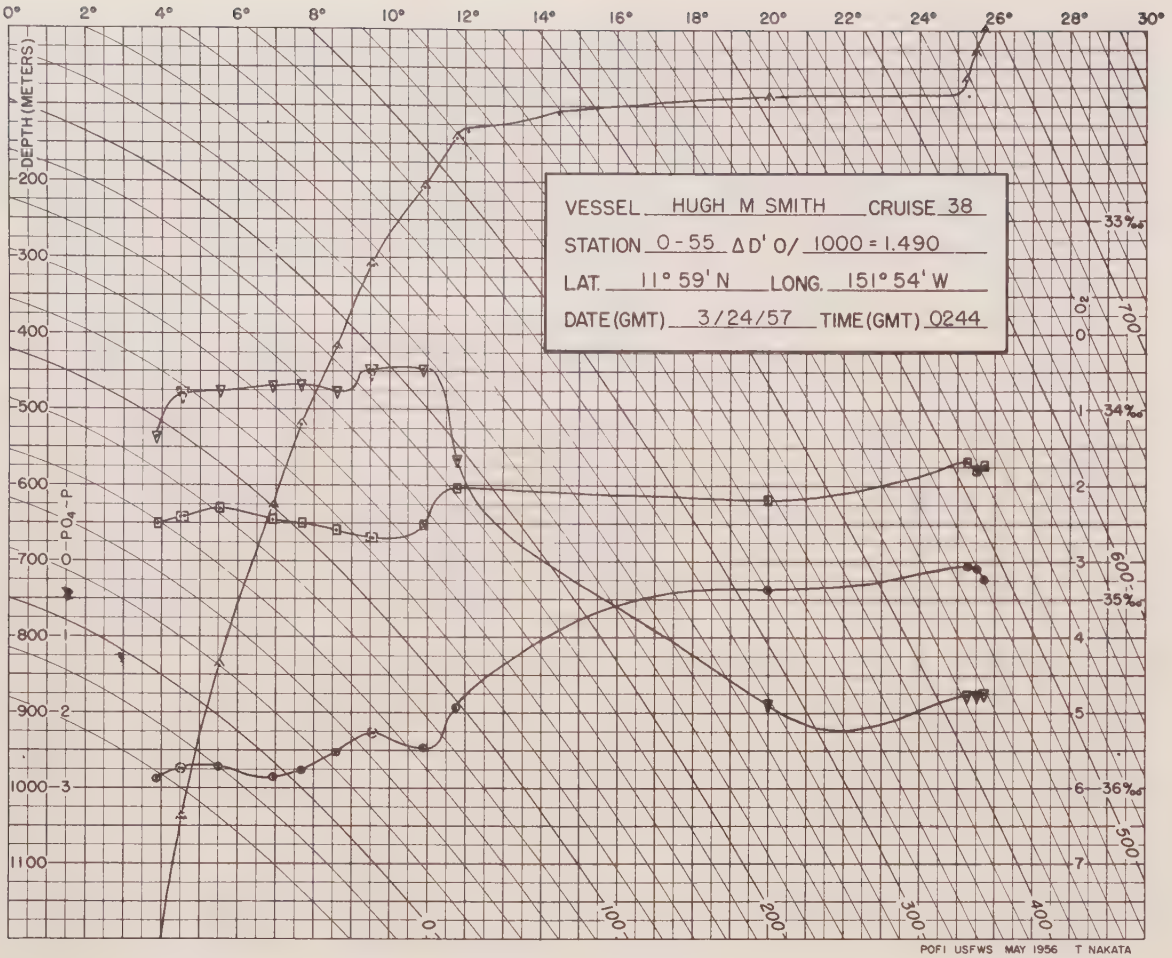
Weather: 02, cloud coverage 2. Wind: 090°, 08 kt. Sea: 1-3 ft. Wire angle: 34°.
BT slide: 251. Dry bulb: 83.2°F. Wet bulb: 76.9°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	27.38	34.90	531.3	4.80	0.24
19	26.92	34.90	517.0	4.81	0.23
43	26.26	34.90	497.2	4.80	0.28
67	25.32	35.01	461.4	4.57	0.31
87	24.60	34.99	442.0	4.36	0.38
130	24.00	35.01	423.7	4.26	0.45
175	13.18	34.72	186.4	2.25	1.37
267	11.24	34.81	144.6	1.49	1.15


VESSEL HUGH M SMITH CRUISE 38
STATION 0-54 ΔD' O/ 1000 = 1.454
LAT. 08°56'N LONG. 149°52.5'W
DATE(GMT) 3/23/57 TIME(GMT) 0339
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

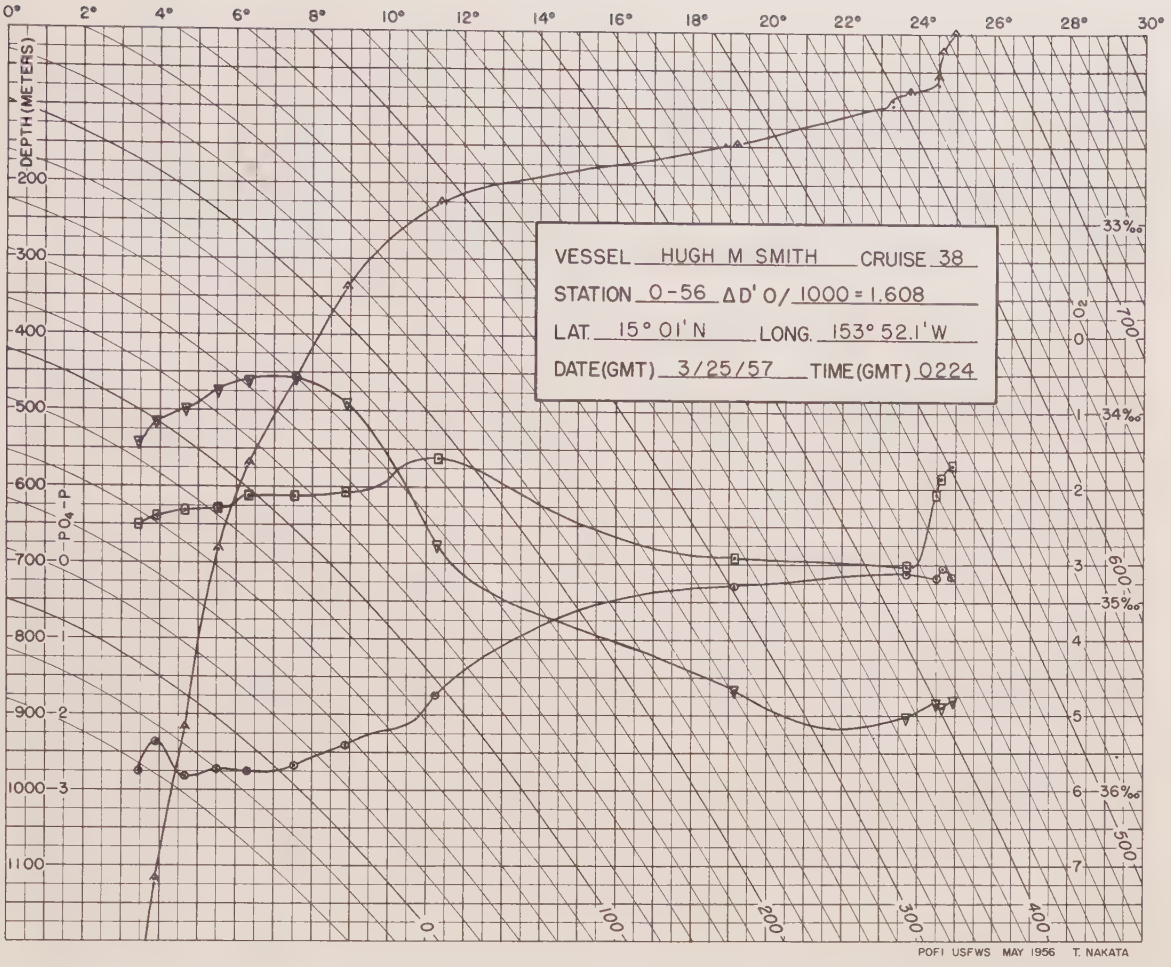
Weather: 02, cloud coverage 7. Wind: 060°, 15 kt. Sea: 3-5 ft. Wire angle: 16°.
BT slide: 261. Dry bulb: 79.0°F. Wet bulb: 76.3°F. Barometric pressure: 1009 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	26.09	34.05	553.4	4.70	0.18
25	25.94	34.05	549.0	4.78	0.10
50	25.78	34.04	545.2	4.78	0.25
70	21.42	34.69	376.7	5.37	0.18
136	12.56	34.56	186.4	0.56	2.12
206	10.98	34.74	145.0	0.23	2.37
307	9.72	34.67	129.5	0.38	2.07
412	8.92	34.65	118.5	0.34	2.06
512	7.95	34.60	107.8	0.28	2.47
617	7.00	34.56	97.7	0.31	2.47
822	5.41	34.52	81.5	0.80	NS
1024	4.59	34.54	71.0	1.07	NS
1229	3.87	34.56	62.1	1.46	2.61


VESSEL HUGH M SMITH CRUISE 38
STATION 0-55 ΔD' O/ 1000 = 1.490
LAT. 11° 59' N LONG. 151° 54' W
DATE (GMT) 3/24/57 TIME (GMT) 0244
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

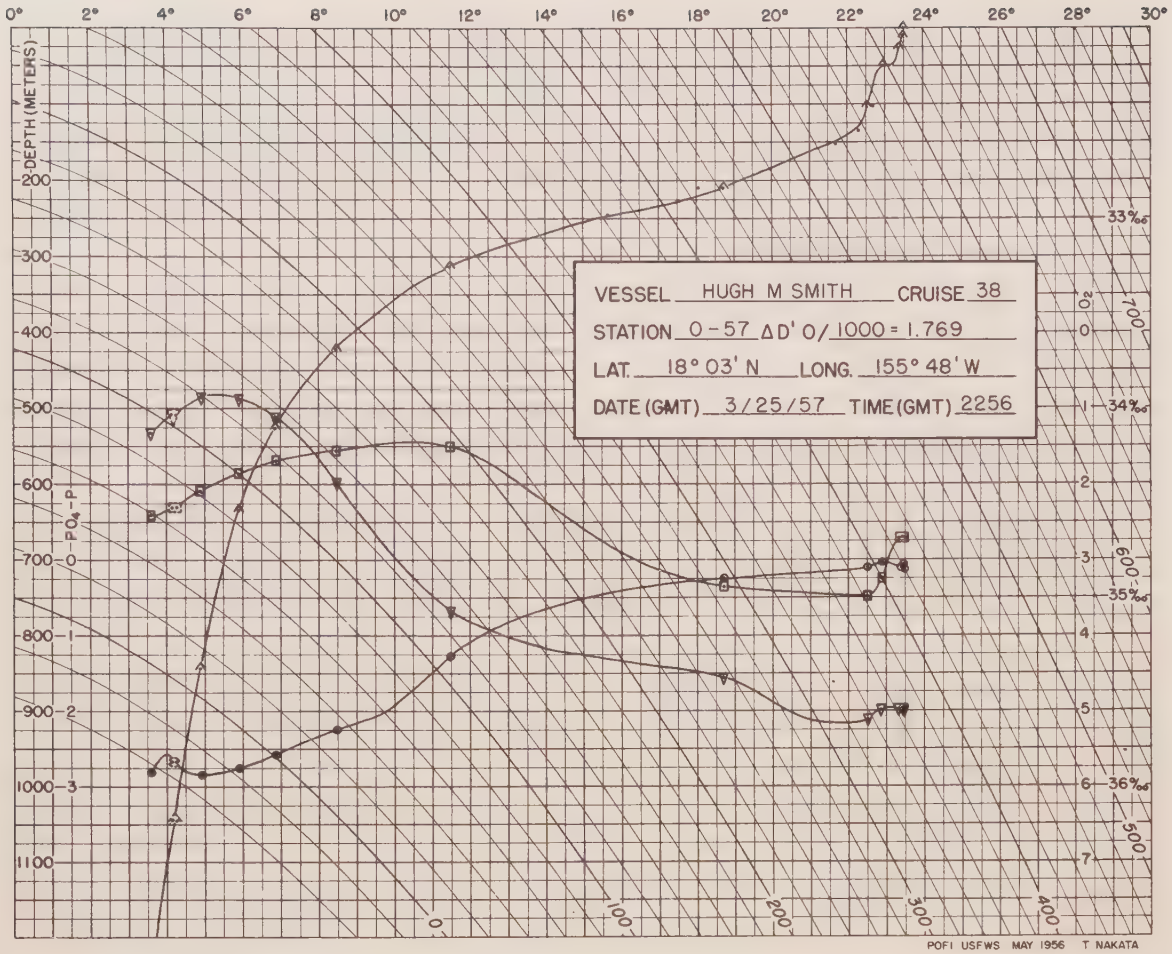
Weather: 02, cloud coverage 4. Wind: 070°, 14 kt. Sea: 3-5 ft. Wire angle: 19°.
BT slide: 265. Dry bulb: 79.2°F. Wet bulb: 75.9°F. Barometric pressure: 1010 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	25.72	34.29	525.0	4.74	0.21
30	25.48	34.31	516.5	4.76	0.10
65	25.26	34.27	513.0	4.75	0.06
86	19.96	34.47	354.7	4.88	0.37
142	11.79	34.42	182.7	1.63	1.94
207	10.90	34.61	153.2	0.43	2.47
309	9.50	34.67	126.0	0.46	2.27
309	9.57	34.67	127.0	-	-
417	8.60	34.63	115.1	0.76	2.52
519	7.68	34.60	104.0	0.68	2.76
626	6.92	34.58	95.3	0.69	2.85
836	5.54	34.52	82.8	0.76	2.71
1039	4.58	34.56	69.2	0.77	2.71
1039	4.53	34.56	68.7	-	-
1246	3.87	34.60	59.2	1.33	2.86


VESSEL HUGH M SMITH CRUISE 38
STATION 0-56 ΔD' O/ 1000 = 1.608
LAT. 15° 01' N LONG. 153° 52.1' W
DATE(GMT) 3/25/57 TIME(GMT) 0224
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T. NAKATA

Weather: 15, cloud coverage 8. Wind: 080°, 19 kt. Sea: 3-5 ft. Wire angle: 12°.
BT slide: 270. Dry bulb: 77.5°F. Wet bulb: 73.0°F. Barometric pressure: 1011 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	24.93	34.27	503.4	4.82	0.14
26	24.65	34.34	490.4	4.89	0.06
57	24.52	34.42	480.9	4.85	0.18
77	23.73	34.81	430.5	5.01	0.10
149	19.18	34.76	315.0	4.69	0.29
227	11.33	34.25	187.4	2.75	1.72
339	8.90	34.43	134.5	0.90	2.40
457	7.54	34.45	113.5	0.58	2.67
570	6.35	34.45	97.8	0.60	2.76
682	5.56	34.51	83.8	0.71	2.71
917	4.66	34.52	72.8	0.99	2.81
1119	3.90	34.56	62.4	1.16	2.37
1326	3.42	34.60	55.0	1.41	2.74


VESSEL HUGH M SMITH CRUISE 38
STATION 0-57 ΔD' O/1000 = 1.769
LAT. 18° 03' N LONG. 155° 48' W
DATE (GMT) 3/25/57 TIME (GMT) 2256
DEPTH (METERS)
PO4-P
POFI USFWS MAY 1956 T NAKATA

Weather: 15, cloud coverage 8. Wind: 020°, 12 kt. Sea: 3-5 ft. Wire angle: 12°.
BT slide: 274. Dry bulb: 72.4°F. Wet bulb: 69.0°F. Barometric pressure: 1014 mb.

Depth, m.	T, °C.	S, °/oo	δ t, cl./ton	O_2, ml./L.	PO_4-P, µg at./L.
0	23.46	34.69	431.0	5.01	0.06
10	23.44	34.69	430.8	4.97	0.10
25	23.36	34.69	428.4	4.99	0.11
51	22.86	34.90	399.5	5.00	0.06
102	22.52	34.99	383.7	5.11	0.10
210	18.71	34.94	290.5	4.54	0.25
313	11.46	34.20	193.2	3.68	1.27
421	8.45	34.22	143.4	1.97	2.22
524	6.88	34.27	117.9	1.10	2.58
632	5.90	34.34	100.5	0.86	2.76
842	4.90	34.43	82.3	0.85	2.82
1045	4.23	34.52	68.8	1.06	2.66
1045	4.18	34.52	68.0	-	-
1252	3.60	34.56	59.6	1.31	2.80

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H. O. Pub. 606-c, second edition, 1956)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
1	0000	1/13	19°03'N	155°57' W	76.0	12	10	77.6	65.5	1015	58	8	5	9	3	12	3	34.88
2	0600	1/13	18°36'N	155°14' W	74.5	10	24	72.8	64.9	1019	01	8	8	9	3	10	3	34.88
3	1200	1/13	18°10'N	154°31' W	74.1	05	14	72.9	62.1	1016	02	8	7	9	3	XX	X	34.67
4	1800	1/13	17°44'N	153°47' W	75.2	06	17	71.0	64.0	1016	15	8	7	8	3	06	4	34.49
5	0000	1/14	17°16'N	153°03' W	75.3	05	17	71.0	64.9	1012	02	8	6	9	2	06	4	34.52
6	0600	1/14	16°49'N	152°17' W	74.8	05	16	71.5	64.5	1013	02	6	8	9	3	05	4	34.58
7	1200	1/14	16°20'N	151°27' W	73.7	07	14	71.1	66.9	1012	02	4,8	8	8	3	XX	X	34.70
8	1800	1/14	15°53'N	150°39' W	73.7	12	13	73.8	65.0	1012	02	4,8	8	9	2	XX	X	34.85
9	0000	1/15	15°24'N	149°51' W	75.5	07	14	75.0	69.1	1009	02	4,8	9	9	3	06	2	34.34
10	0600	1/15	14°56'N	149°02' W	75.5	11	16	75.5	69.3	1012	02	4,5,8	8	9	3	07	3	34.23
11	1200	1/15	14°28'N	148°13' W	75.8	08	13	75.5	71.0	1011	02	4,8	9	9	3	XX	X	34.22
12	1800	1/15	14°01'N	147°24' W	76.5	06	17	75.7	71.4	1012	02	4,8	7	9	3	06	3	34.11
13	0000	1/16	13°32'N	146°37' W	77.4	09	19	78.0	73.4	1010	02	6,9	6	9	3	06	3	34.16
14	0600	1/16	13°03'N	145°50' W	76.0	08	22	76.2	73.0	1011	02	4,8	6	9	3	XX	X	34.16
15	1200	1/16	12°34'N	145°04' W	78.4	07	19	75.5	72.6	1010	02	4,8	7	9	4	06	3	34.23
16	1800	1/16	12°07'N	144°22' W	75.4	08	22	76.8	73.9	1012	02	8	2	9	4	07	3	34.07
17	0000	1/17	11°40'N	143°38' W	76.6	07	16	78.0	73.9	1010	03	4,8	4	9	4	06	3	34.04
18	0600	1/17	11°15'N	142°53' W	77.0	07	22	77.8	74.5	1012	03	4,8	6	9	3	07	3	34.22
19	1200	1/17	10°50'N	142°08' W	76.9	05	28	76.5	73.3	1011	51	X	X	9	4	06	3	34.05
20	1800	1/17	10°25'N	141°24' W	76.9	05	26	77.3	73.7	1013	01	8	2	9	5	06	3	33.75
21	0000	1/18	10°00'N	140°39' W	76.0	06	25	79.3	73.4	1010	03	3,8	5	8	5	06	3	33.75
22	0600	1/18	09°35'N	139°55' W	77.0	06	24	77.1	73.0	1011	02	2,4	5	9	4	06	X	33.75
23	1200	1/18	09°10'N	139°10' W	76.8	04	28	76.2	71.9	1010	02	8	2	9	5	05	5	33.77
24	1800	1/18	08°45'N	138°26' W	79.0	05	25	79.0	74.0	1012	02	8	8	9	5	05	5	34.42
25	0000	1/19	08°18'N	137°38' W	79.3	06	20	79.4	73.7	1008	02	8	7	8	5	05	4	34.45
26	0600	1/19	07°50'N	136°47' W	79.3	05	26	78.2	74.8	1010	02	4,8	6	9	4	07	X	34.56
27	1200	1/19	07°22'N	135°55' W	79.0	02	24	79.4	75.5	1008	02	4,8	7	9	4	06	4	34.85
27A	1800	1/19	06°54'N	135°04' W	78.7	05	06	77.0	74.9	1010	51	8	7	8	3	06	3	34.56
28	0000	1/20	06°23'N	134°16' W	79.6	11	06	78.9	75.0	1008	15	8	8	9	2	06	3	34.65
29	0600	1/20	05°49'N	133°33' W	79.0	15	08	80.0	75.0	1012	02	X	9	9	2	XX	X	34.78
30	1200	1/20	05°16'N	132°50' W	78.8	13	15	79.4	74.6	1010	02	6	9	9	2	XX	X	34.78
31	1800	1/20	04°43'N	132°07' W	79.1	14	18	80.0	75.0	1012	03	8	4	9	3	12	3	34.90
32	0000	1/21	04°14'N	131°22' W	76.9	15	18	79.0	73.7	1008	01	1,8	4	9	3	15	1	34.87
33	0600	1/21	03°46'N	130°36' W	76.8	13	17	78.2	74.0	1011	01	8	1	9	3	XX	X	34.54
34	1200	1/21	03°20'N	129°51' W	77.6	13	12	77.6	71.4	1010	02	8	1	9	2	XX	X	34.56
35	1800	1/21	02°52'N	129°06' W	77.9	14	12	80.0	73.6	1014	03	8,9	2	9	2	11	1	34.67

Table 2. --Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
36	0000	1/22	02°22'N	128°20'W	79.0	14	10	79.8	72.6	1010	01	4,8	1	9	2	11	1	34.58
37	0600	1/22	01°50'N	127°35'W	77.5	13	12	78.0	73.0	1012	02	4,8	1	9	2	XX	X	34.81
38	1200	1/22	01°18'N	126°50'W	78.5	09	10	76.2	70.5	1010	02	4	1	9	2	XX	X	34.79
39	1800	1/22	00°44'N	126°05'W	76.5	09	08	79.0	73.7	1013	02	8	2	9	2	10	2	34.97
40	0000	1/23	00°12'N	125°20'W	75.2	09	09	77.0	72.3	1010	02	8	1	9	2	10	1	35.05
41	0200	1/23	00°02'N	125°05'W	76.9	09	10	76.7	71.9	1010	02	8	1	9	2	09	1	35.07
42	0310	1/23	00°03'N	125°04'W	-	--	--	-	-	----	--	-	-	-	-	--	-	35.07
43	0900	1/23	00°03'N	124°39'W	77.4	12	14	77.0	71.5	1011	02	8	1	9	2	XX	X	-
44	1200	1/23	00°03'N	123°52'W	75.2	13	13	76.8	71.9	1010	02	8	2	9	2	XX	X	-
45	1600	1/23	00°03'N	123°19'W	75.5	09	12	76.0	72.1	1012	02	8	3	9	2	09	1	35.07
46	1700	1/23	00°03'N	123°17'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
47	1930	1/23	00°04'N	122°59'W	75.7	15	18	76.8	72.3	1013	02	8	1	9	2	15	1	35.05
48	2230	1/23	00°06'N	122°35'W	76.4	15	12	80.6	75.0	1010	02	8	2	9	2	14	1	-
49	0130	1/24	00°10'N	122°08'W	76.2	13	15	81.0	76.7	1010	02	8	1	9	2	14	1	-
50	0545	1/24	00°09'N	121°41'W	76.3	13	15	77.5	73.7	1013	02	8	1	9	2	13	1	-
51	0900	1/24	00°13'N	121°14'W	75.7	14	14	76.0	72.6	1012	02	X	1	9	2	14	1	-
52	1200	1/24	00°17'N	120°47'W	75.9	14	15	75.5	72.3	1011	02	8	3	9	3	14	1	-
53	1600	1/24	00°22'N	120°11'W	75.9	14	14	77.6	72.9	1013	02	8	2	9	3	13	1	34.43
54	1705	1/24	00°22'N	120°11'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
55	1930	1/24	00°25'N	119°51'W	76.1	13	22	78.7	73.8	1012	02	8	1	9	3	13	1	34.40
56	2230	1/24	00°21'N	119°30'W	76.4	16	22	78.8	73.4	1010	02	8	7	9	3	13	1	-
57	0130	1/25	00°15'N	119°02'W	75.5	16	14	77.7	73.3	1010	02	8	2	9	3	13	1	-
58	0600	1/25	00°07'N	118°32'W	75.5	15	15	76.4	72.6	1013	02	8	3	9	3	13	1	-
59	0900	1/25	00°02'N	118°05'W	75.4	15	14	77.0	74.5	1012	02	X	X	9	3	13	1	-
60	1200	1/25	00°04'S	117°37'W	75.0	15	14	76.6	72.9	1011	02	X	1	9	3	XX	X	34.61
61	1500	1/25	00°10'S	117°12'W	75.0	15	11	75.5	72.1	1013	03	4,8	7	9	2	14	1	34.70
62	1605	1/25	00°10'S	117°12'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
63	1830	1/25	00°14'S	116°50'W	75.5	13	13	78.8	73.7	1014	02	1,9	1	9	2	13	1	-
64	2100	1/25	00°13'S	116°31'W	76.0	15	10	79.4	73.2	1012	02	1,8	5	9	2	14	1	-
65	0000	1/26	00°10'S	116°02'W	75.8	14	14	77.3	71.9	1010	02	6	7	9	2	14	1	-
66	0300	1/26	00°07'S	115°32'W	75.4	14	14	77.7	73.5	1012	02	6	4	9	2	14	1	-
67	0700	1/26	00°03'S	115°17'W	75.4	14	12	77.8	73.6	1016	02	X	X	9	2	XX	1	-
68	1000	1/26	00°00'	114°47'W	75.3	15	10	77.0	73.5	1011	02	X	X	9	2	XX	1	-
69	1300	1/26	00°03'N	114°15'W	75.7	14	14	77.0	73.6	1011	02	X	X	9	2	XX	1	-
70	1500	1/26	00°05'N	113°54'W	75.0	14	14	77.3	72.7	1012	02	8,1	4	9	2	13	1	34.99

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Baro-meter, mb.	Wea-ther	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
71	1555	1/26	00°05'N	113°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
72	1830	1/26	00°08'N	113°28'W	75.4	14	14	78.5	73.5	1012	01	8,1	1	9	2	13	1	-
73	2100	1/26	00°05'N	113°10'W	76.2	14	14	80.0	76.7	1010	01	X	0	9	2	13	1	-
74	0000	1/27	00°01'N	112°43'W	75.5	15	16	80.5	77.0	1009	02	8	1	9	2	13	1	-
75	0300	1/27	00°01'S	112°14'W	77.7	15	14	76.8	73.5	1010	02	X	X	9	2	13	1	-
76	0600	1/27	00°06'S	112°03'W	76.1	14	14	77.2	74.6	1012	02	X	X	9	2	13	1	-
77	0900	1/27	00°07'S	111°36'W	76.7	15	11	76.1	71.9	1010	02	8	2	9	2	14	1	-
78	1200	1/27	00°09'S	111°09'W	76.5	15	13	76.5	71.4	1010	03	8	5	9	2	14	1	-
79	1900	1/27	00°12'S	110°12'W	76.4	10	11	76.8	72.4	1012	01	8,6	1	9	2	10	1	-
80	2000	1/27	00°12'S	110°12'W	76.4	10	11	76.8	72.4	1012	01	8,6	1	9	2	10	1	34.42
81	2300	1/27	00°42'S	110°09'W	75.5	13	13	76.9	72.9	1009	03	4,8	7	9	2	13	1	34.42
82	0445	1/28	01°25'S	110°03'W	75.0	18	10	76.3	72.9	1011	02	8	8	9	2	10	1	35.23
83	0545	1/28	01°25'S	110°03'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
84	1000	1/28	02°04'S	110°03'W	75.0	16	14	76.0	72.9	1010	02	X	X	9	2	XX	1	-
85	1500	1/28	02°50'S	110°02'W	75.3	16	15	76.1	72.8	1012	02	8,4	3	9	3	15	1	34.87
86	1550	1/28	02°50'S	110°02'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
87	1830	1/28	03°23'S	110°02'W	75.9	15	16	76.8	72.5	1012	01	8	5	9	3	16	2	34.85
88	2330	1/28	04°07'S	109°51'W	76.2	13	12	76.6	72.1	1010	01	8,4,1	5	9	3	15	2	-
89	0300	1/29	04°43'S	109°45'W	76.2	16	10	76.8	72.9	1012	02	X	X	9	3	15	2	-
90	0550	1/29	04°58'S	109°44'W	75.7	15	15	75.7	72.4	1012	02	8	2	9	3	15	2	34.90
91	0645	1/29	04°58'S	109°44'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
92	1200	1/29	05°40'S	109°51'W	76.0	12	14	75.1	71.1	1011	02	X	3	9	3	14	2	-
93	1600	1/29	06°31'S	109°58'W	76.7	11	12	77.6	72.0	1012	02	8	2	9	2	11	1	-
94	1830	1/29	06°58'S	110°02'W	76.7	12	14	77.9	72.1	1012	01	8	1	9	3	12	1	-
95	2100	1/29	06°58'S	109°56'W	77.4	12	12	76.9	72.0	1011	02	8	3	9	3	12	2	34.97
96	2200	1/29	06°58'S	109°56'W	77.4	12	12	76.9	72.0	1011	02	8	3	9	3	12	2	-
97	0200	1/30	07°42'S	110°04'W	76.9	12	14	76.5	71.5	1010	02	8	2	9	3	12	2	-
98	0600	1/30	08°09'S	110°01'W	76.5	10	11	76.1	70.7	1012	02	X	X	9	3	XX	X	-
99	1100	1/30	09°01'S	110°00'W	76.6	15	10	75.4	70.5	1011	02	X	1	9	2	XX	X	35.46
100	1150	1/30	09°01'S	110°00'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
101	1600	1/30	09°44'S	110°00'W	76.9	11	13	72.9	73.0	1014	01	8	2	9	2	15	3	-
102	1830	1/30	10°10'S	110°00'W	76.8	10	10	77.6	72.1	1013	02	8	1	9	2	15	3	35.48
103	2230	1/30	10°45'S	110°00'W	78.4	11	07	76.8	69.9	1012	02	8	1	9	2	12	2	-
104	0030	1/31	11°01'S	110°00'W	78.0	14	04	78.2	71.2	1011	02	8	1	9	2	14	2	35.61
105	0130	1/31	11°01'S	110°00'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
106	0600	1/31	11°30'S	110°03'W	77.2	11	06	76.1	69.0	1012	02	8	3	9	2	12	2	-
107	1000	1/31	12°09'S	110°04'W	77.1	14	08	71.8	69.9	1012	02	X	1	9	2	XX	X	-
108	1905	1/31	13°06'S	110°03'W	80.9	14	03	79.3	70.9	1012	02	8	1	9	1	16	2	35.81
109	2030	1/31	13°06'S	110°03'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
110	1545	2/1	13°32'S	110°09'W	78.9	03	10	77.0	75.0	1012	01	6,8	6	0	2	13	2	-
111	1935	2/1	13°32'S	110°12'W	79.5	08	08	79.0	74.0	1011	02	6,8	6	9	1	16	4	35.77
112	2030	2/1	13°36'S	110°12'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
113	0000	2/2	13°34'S	110°15'W	79.4	04	06	77.6	73.0	1009	18	6,8	7	9	2	12	2	-
114	1507	2/2	13°37'S	110°25'W	79.1	05	10	79.0	72.9	1010	02	6,8	3	9	2	01	-	-
115	1522	2/2	13°37'S	110°25'W	79.1	05	08	79.0	72.9	1010	02	6,8	3	9	2	02	2	-
116	1537	2/2	13°37'S	110°25'W	79.1	05	10	79.0	72.9	1010	02	6,8	3	9	2	22	2	-
117	1552	2/2	13°37'S	110°25'W	78.9	05	06	79.0	72.9	1010	02	6,8	3	9	2	22	2	-
118	1930	2/2	13°38'S	110°28'W	79.3	07	12	78.4	73.4	1010	02	8	2	9	3	12	2	35.86
119	2030	2/2	13°38'S	110°28'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
120	2000	2/3	13°39'S	110°39'W	80.0	08	05	80.0	72.8	1012	02	8	2	9	2	15	2	35.93
121	2100	2/3	13°39'S	110°39'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
122	1945	2/4	13°38'S	111°02'W	79.9	09	10	79.7	73.8	1012	02	8	2	9	2	11	1	-
123	1950	2/5	13°45'S	111°15'W	79.9	08	11	80.4	75.0	1011	02	8	3	9	2	08	1	35.99
124	2050	2/5	13°45'S	111°15'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
125	1600	2/6	13°48'S	111°44'W	79.9	12	12	80.1	76.5	1012	01	8	3	9	2	08	1	-
126	1950	2/6	13°48'S	111°48'W	80.1	07	12	80.0	73.8	1010	02	8	2	9	3	08	1	35.97
127	2050	2/6	13°48'S	111°48'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
128	1945	2/7	13°60'S	112°01'W	79.4	09	18	77.9	73.3	1011	03	8	7	9	3	09	1	35.88
129	2040	2/7	13°60'S	112°01'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
130	1930	2/8	14°06'S	112°18'W	80.2	09	13	79.7	74.2	1012	01	8	3	9	3	09	1	-
131	1950	2/9	14°10'S	112°33'W	80.1	09	17	79.8	73.2	1011	02	8	2	9	3	16	5	36.00
132	2050	2/9	14°10'S	112°33'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
133	1950	2/10	14°13'S	112°45'W	80.1	09	16	80.0	73.5	1010	02	8	3	9	3	16	4	36.08
134	2045	2/10	14°13'S	112°45'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
135	1945	2/11	14°15'S	112°58'W	80.3	07	11	79.6	73.2	1011	03	8	3	9	3	17	4	36.02
136	2040	2/11	14°15'S	112°58'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
137	1915	2/13	14°21'S	113°27'W	80.3	06	17	80.5	78.4	1012	02	8,1	4	9	3	12	4	-
138	1915	2/14	14°23'S	113°44'W	80.4	09	15	80.1	77.8	1011	02	8,1	7	9	3	12	4	-
139	1930	2/15	14°24'S	114°07'W	80.2	08	12	78.2	72.9	1011	16	8	7	9	3	12	4	-
140	1940	2/16	14°18'S	114°28'W	80.4	08	12	80.7	73.6	1011	01	8,1	2	9	3	12	4	36.00

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
141	2030	2/16	14°18'S	114°28'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
142	0140	2/18	14°12'S	115°17'W	81.2	21	03	81.2	76.5	1012	02	8	2	9	2	10	1	36.00
143	1455	2/18	14°00'S	116°17'W	80.8	07	13	81.7	77.5	1012	02	8,1	6	9	3	10	3	35.91
144	2000	2/18	13°56'S	116°40'W	81.0	04	16	82.8	78.7	1012	03	8,4	7	9	3	10	3	35.82
145	1500	2/19	13°37'S	118°16'W	80.1	10	17	81.9	77.8	1012	01	8,1	6	9	3	10	3	35.79
146	2040	2/20	12°46'S	119°35'W	80.7	06	14	83.1	79.8	1012	03	8	6	9	3	10	3	35.81
147	0750	2/25	00°00'	129°59'W	77.6	09	08	77.8	74.7	1012	02	8	2	9	2	09	1	34.94
148	0850	2/25	00°00'	130°00'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
149	1400	2/25	00°47'S	129°56'W	77.1	11	10	76.7	74.1	1011	02	8	1	9	2	10	1	-
150	1940	2/25	01°35'S	129°51'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
151	2030	2/25	01°35'S	129°51'W	78.4	13	09	80.0	75.5	1011	03	8,4	6	9	2	06	1	34.96
152	0300	2/26	02°37'S	129°53'W	79.5	11	07	80.0	75.0	1010	02	8,4	3	9	2	11	2	-
153	0650	2/26	03°00'S	129°50'W	79.0	11	08	79.2	75.7	1012	02	8	3	9	2	35	2	-
154	0755	2/26	03°00'S	129°50'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
155	1500	2/26	04°11'S	130°02'W	79.1	12	08	78.7	75.2	1011	02	8	2	9	2	35	2	35.17
156	2030	2/26	04°59'S	130°05'W	80.5	10	06	80.2	74.9	1012	02	8	4	9	2	12	2	35.14
157	2120	2/26	04°59'S	130°05'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
158	0200	2/27	05°48'S	130°11'W	80.4	11	07	80.7	76.0	1009	02	8	2	9	2	11	1	-
159	0805	2/27	06°33'S	129°59'W	79.8	11	10	79.3	75.8	1012	02	X	1	9	2	XX	1	35.19
160	0855	2/27	06°33'S	129°59'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
161	1500	2/27	07°33'S	130°03'S	80.0	09	10	79.5	75.0	1011	02	8	4	9	2	11	1	35.25
162	2030	2/27	08°29'S	130°03'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
163	2115	2/27	08°29'S	130°03'W	81.0	09	10	80.3	75.1	1011	02	8	1	9	2	16	1	35.46
164	0100	2/28	09°08'S	130°04'W	81.8	10	09	80.9	74.8	1010	02	8	1	9	2	13	1	35.50
165	0755	2/28	10°01'S	129°55'W	82.0	09	07	81.0	75.1	1012	02	8	1	9	2	13	1	35.70
166	0850	2/28	10°01'S	129°55'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
167	1400	2/28	10°54'S	129°59'W	82.5	10	08	80.0	74.4	1010	02	8,4	5	9	2	16	1	-
168	1900	2/28	11°48'S	129°58'W	82.7	07	11	83.0	75.2	1012	02	8	1	9	2	16	1	35.90
169	1950	2/28	11°48'S	129° 58'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
170	2250	2/28	12°12'S	130°01'W	85.5	08	04	82.5	77.6	1010	03	8	7	9	0	13	2	36.09
171	0815	3/1	13°33'S	130°01'W	83.7	25	04	80.4	74.1	1012	03	8	5	9	2	16	1	35.95
172	0905	3/1	13°33'S	130°01'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
173	1500	3/1	14°32'S	129°56'W	82.2	XX	00	78.0	74.8	1012	03	4,8	8	9	1	31	1	35.99
174	1845	3/1	15°10'S	129°54'W	83.0	30	02	81.9	75.2	1012	15	8,4	5	9	1	--	-	35.84
175	1930	3/1	15°10'S	129°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
176	0000	3/2	15°50'S	129°57'W	82.9	36	11	81.6	76.6	1010	21	8	5	9	2	30	1	-
177	0400	3/2	16°29'S	130°03'W	83.2	31	05	81.2	73.1	1012	15	8	3	9	1	22	1	-
178	0450	3/2	16°29'S	130°03'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
179	0900	3/2	16°56'S	130°07'W	82.6	26	04	80.8	77.1	1012	00	X	X	9	1	XX	1	36.09
180	1630	3/2	18°03'S	130°03'W	82.5	10	07	83.0	79.4	1012	02	8,1	2	9	1	20	1	36.31
181	1715	3/2	18°04'S	130°02'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
182	2100	3/2	18°08'S	130°40'W	82.4	33	10	83.5	78.2	1012	02	8	4	9	2	30	1	36.18
183	0200	3/3	18°05'S	131°18'W	82.3	32	12	82.3	75.2	1010	01	8,4	5	9	3	32	3	-
184	0445	3/3	18°03'S	131°53'W	82.3	30	17	81.3	74.4	1012	20	8	3	9	3	33	3	36.31
185	0530	3/3	18°03'S	131°53'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
186	1000	3/3	17°56'S	132°21'W	82.5	30	06	80.2	73.7	1012	13	8	3	9	3	32	3	-
187	1400	3/3	17°54'S	132°58'W	81.7	10	05	76.6	72.3	1012	50	4,8	7	8	3	32	3	-
188	1800	3/3	17°52'S	133°36'W	81.8	31	16	79.6	76.5	1013	15	8	7	8	3	32	3	36.31
189	2100	3/3	17°49'S	134°01'W	82.7	35	18	80.6	76.7	1012	51	8,6	9	8	3	34	3	36.24
190	2155	3/3	17°49'S	134°01'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
191	0100	3/4	17°50'S	134°31'W	82.3	33	18	79.5	77.5	1010	50	6	9	8	4	33	3	-
192	0800	3/4	17°43'S	135°16'W	82.0	34	16	80.0	76.5	1012	21	6	9	8	4	33	3	-
193	1615	3/4	17°40'S	136°16'W	81.7	32	22	80.1	74.2	1010	21	6	9	8	4	33	3	36.15
194	1710	3/4	17°40'S	136°16'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
195	2200	3/4	17°37'S	136°50'W	81.7	33	23	81.2	76.0	1009	15	5,8	9	8	4	33	3	-
196	0300	3/5	17°34'S	137°32'W	81.8	32	22	80.5	76.2	1008	15	8,4	8	8	4	32	3	-
197	0740	3/5	17°31'S	138°10'W	81.8	32	18	80.8	76.3	1010	15	8	5	8	4	32	3	36.09
198	0835	3/5	17°31'S	138°10'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
199	1400	3/5	17°28'S	138°55'W	81.7	33	14	80.0	77.8	1008	01	8	3	9	3	XX	3	-
200	1800	3/5	17°37'S	139°30'W	81.8	35	18	81.1	75.7	1010	15	3,8	6	9	3	34	1	-
201	2100	3/5	17°43'S	139°54'W	82.4	35	19	82.9	76.6	1009	01	4,8	5	9	3	34	1	36.26
202	2200	3/5	17°43'S	139°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
203	0400	3/6	17°56'S	140°41'W	82.6	34	06	81.8	75.5	1010	02	8	8	7	2	XX	X	-
204	2030	3/6	18°00'S	140°57'W	82.6	30	16	80.7	79.0	1011	01	8,1	4	9	2	30	1	-
205	0800	3/7	17°55'S	142°35'W	82.7	31	14	83.4	76.9	1011	02	X	9	9	2	30	1	-
206	1500	3/7	17°59'S	143°21'W	83.0	30	22	80.8	76.9	1010	00	8,4	7	9	3	30	1	-
207	2030	3/7	18°04'S	144°12'W	82.8	32	22	80.8	75.2	1011	02	6,8	8	9	4	32	3	36.35
208	2120	3/7	18°04'S	144°12'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
209	0300	3/8	18°03'S	145°02'W	82.5	30	21	81.9	76.2	1009	02	8,5	8	9	4	31	3	-
210	1130	3/8	18°00'S	145°34'W	83.2	28	15	82.2	76.5	1010	01	8,5	6	9	4	30	3	36.38

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
211	1230	3/8	18°00'S	145°34'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
212	1705	3/8	17°59'S	146°54'W	83.1	27	11	81.6	76.9	1010	02	1,8	6	9	3	27	1	-
213	2130	3/8	17°57'S	147°34'W	83.8	27	10	84.7	78.0	1009	02	1,8	5	9	3	27	1	-
214	0100	3/9	17°57'S	148°06'W	83.2	30	12	82.5	79.1	1008	51	6,8	8	7	3	32	1	36.26
215	0200	3/9	17°57'S	148°06'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
216	1120	3/15	13°55'S	145°09'W	83.5	10	12	81.4	78.0	1010	02	6,8	7	9	2	13	1	36.24
217	1230	3/15	13°55'S	145°09'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
218	1700	3/15	13°10'S	145°04'W	83.7	09	07	82.5	79.0	1011	02	6,8	7	9	2	--	-	-
219	2200	3/15	12°27'S	144°59'W	84.5	09	08	85.0	79.0	1010	02	2,4,8	7	9	2	09	1	36.13
220	2250	3/15	12°27'S	144°59'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
221	0400	3/16	11°39'S	145°01'W	84.5	06	10	84.5	79.9	1010	02	2,4,8	7	9	2	10	1	-
222	1015	3/16	11°00'S	144°57'W	83.7	09	08	82.3	76.4	1010	01	8	3	9	2	09	1	35.99
223	1110	3/16	11°00'S	144°57'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
224	1630	3/16	10°10'S	145°04'W	83.9	06	11	82.9	78.7	1011	15	8	2	9	2	07	1	-
225	2200	3/16	09°23'S	145°09'W	84.0	05	09	85.4	76.8	1012	02	8,1	2	9	2	06	1	35.86
226	2255	3/16	09°23'S	145°09'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
227	0400	3/17	08°33'S	145°11'W	84.0	03	05	83.9	77.2	1011	02	8,3	6	9	1	10	1	-
228	0805	3/17	08°05'S	145°12'W	82.8	01	05	81.5	76.3	1012	01	8,1	1	9	2	09	1	-
229	0900	3/17	08°04'S	145°12'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
230	1630	3/17	06°53'S	145°10'W	82.0	03	05	81.0	77.0	1012	02	8,1	2	9	2	00	1	35.79
231	1915	3/17	06°31'S	145°01'W	82.1	06	08	83.2	76.7	1013	02	8,1	2	9	2	06	1	35.53
232	2010	3/17	06°31'S	145°01'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
233	0100	3/18	05°48'S	145°03'W	83.0	08	09	82.0	75.9	1010	02	8,1	3	9	2	06	1	-
234	0600	3/18	05°00'S	145°00'W	83.7	09	12	81.0	76.7	1010	02	8	2	9	2	06	1	35.37
235	1250	3/18	05°00'S	145°00'W	83.7	09	12	81.0	76.7	1010	02	8	2	9	2	06	1	-
236	1200	3/18	04°31'S	144°56'W	81.9	09	15	80.7	76.2	1010	02	8	2	9	2	06	1	-
237	1600	3/18	03°54'S	144°59'W	81.7	08	09	80.7	76.9	1010	00	8	4	9	2	06	1	-
238	1825	3/18	03°32'S	144°59'W	81.7	09	13	83.0	77.3	1011	01	8	1	9	2	09	1	35.52
239	1925	3/18	03°32'S	144°59'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
240	0400	3/19	02°24'S	144°54'W	81.3	09	13	81.1	76.8	1008	03	8	3	9	3	09	1	-
241	1030	3/19	01°46'S	144°54'W	80.4	10	11	80.9	77.5	1008	02	8	2	9	2	09	1	35.12
242	1135	3/19	01°46'S	144°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
243	2045	3/19	00°47'S	144°58'W	81.0	08	06	83.8	78.8	1010	02	8	4	9	1	09	1	-
244	0315	3/20	00°01'N	145°02'W	81.1	09	08	81.4	76.3	1009	02	8	1	9	2	06	1	35.01
245	0410	3/20	00°01'N	145°02'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-

Table 2.--Observations at bathythermograph lowerings, Hugh M. Smith cruise 38 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
246	0715	3/20	00°16'N	145°00'W	80.4	09	09	81.5	77.2	1010	02	8	1	9	2	08	1	-
247	0920	3/20	00°31'N	145°02'W	80.3	09	09	81.2	77.0	1010	02	8	1	9	2	08	1	-
248	1130	3/20	00°45'N	145°04'W	80.2	07	08	80.0	76.2	1009	02	8	1	9	2	08	1	34.92
249	1415	3/20	00°59'N	145°05'W	80.0	08	08	80.2	76.4	1010	02	8	1	9	2	08	1	-
250	1450	3/20	00°59'N	145°05'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
251	2150	3/20	02°01'N	145°06'W	81.9	09	08	83.2	76.9	1011	02	8	2	9	2	06	1	-
252	0400	3/21	02°49'N	145°39'W	81.2	05	07	82.7	73.9	1010	02	8	2	9	2	04	3	34.94
253	1000	3/21	03°38'N	146°13'W	80.5	05	11	80.4	77.7	1010	02	8	2	9	2	04	3	34.97
254	1600	3/21	04°27'N	146°46'W	80.4	08	10	80.0	76.0	1010	03	8	2	9	2	04	3	34.99
255	2200	3/21	05°16'N	147°11'W	82.0	07	06	83.2	78.9	1010	02	6,8	6	9	2	05	3	34.97
256	0400	3/22	06°00'N	147°45'W	81.7	07	14	81.0	78.0	1010	02	4,8	5	9	1	05	2	34.90
257	1000	3/22	06°45'N	148°14'W	81.1	06	14	80.9	77.9	1011	02	8,9	3	9	2	05	2	34.81
258	1610	3/22	07°31'N	148°46'W	80.0	06	18	79.4	75.7	1010	15	8,4	6	9	3	06	3	34.60
259	2200	3/22	08°19'N	149°17'W	79.0	05	14	81.9	77.8	1010	03	6	8	8	3	06	3	34.14
260	0315	3/23	08°56'N	149°52'W	79.0	06	15	79.0	76.3	1009	02	4,6	7	9	3	06	3	-
261	0415	3/23	08°57'N	149°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
262	1000	3/23	09°41'N	150°22'W	78.5	08	15	79.3	76.9	1010	02	X	X	9	3	XX	X	34.09
263	1645	3/23	10°41'N	150°59'W	78.8	07	15	78.9	75.9	1011	02	8	4	9	3	07	3	34.20
264	2200	3/23	11°23'N	151°26'W	79.1	07	16	81.3	77.9	1011	02	8,4	5	9	3	08	3	34.34
265	0215	3/24	11°59'N	151°54'W	78.4	07	14	79.2	75.9	1010	02	8,4	4	9	3	07	3	-
266	0305	3/24	11°59'N	151°54'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
267	0900	3/24	12°58'N	152°33'W	77.9	09	12	78.7	76.3	1013	03	X	7	9	3	XX	X	34.25
268	1615	3/24	13°47'N	153°04'W	77.1	07	21	74.0	73.5	1012	61	8,6	7	8	3	07	3	34.25
269	2200	3/24	14°37'N	153°36'W	76.9	08	17	76.4	75.0	1013	51	6	8	8	3	08	3	34.29
270	0055	3/25	15°01'N	153°52'W	76.9	08	19	77.5	73.0	1011	15	5,8	8	9	3	08	3	-
271	0150	3/25	15°01'N	153°52'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-
272	0800	3/25	16°02'N	154°31'W	76.3	11	12	74.1	72.9	1014	61	X	9	7	3	XX	X	34.20
273	1600	3/25	17°10'N	155°14'W	75.3	36	10	72.8	69.8	1012	51	0,9	8	8	2	36	1	34.38
274	2230	3/25	18°03'N	155°48'W	74.0	02	12	72.4	69.0	1014	15	0,8,4	8	9	3	02	1	-
275	2320	3/25	18°03'N	155°48'W	-	--	--	-	-	----	--	-	-	-	-	--	-	-

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H. O. Pub. 606-c, second edition, 1956)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
1	0800	1/12	21°25'N	158°16' W	75.7	09	16	73.8	65.2	1020	00	X	X	X	3	11	1
2	0955	1/12	21°25'N	158°26' W	76.0	09	16	73.8	65.1	1019	00	X	X	X	3	09	1
3	1145	1/12	21°25'N	158°36' W	75.8	10	18	73.8	66.2	1021	00	X	X	X	4	09	3
4	1300	1/12	21°25'N	158°46' W	75.9	12	16	74.5	67.8	1018	00	X	X	X	4	09	4
5	1410	1/12	21°25'N	158°56' W	76.1	08	15	74.2	66.1	1020	00	X	X	X	4	XX	4
6	1510	1/12	21°34'N	158°55' W	75.9	07	14	73.8	65.9	1020	00	X	X	X	4	XX	4
7	1615	1/12	21°35'N	158°46' W	75.4	07	14	73.3	65.7	1020	00	X	X	X	4	XX	4
8	1800	1/12	21°25'N	158°36' W	75.7	09	21	72.5	65.8	1019	00	3	1	7	4	07	4
9	1920	1/12	21°36'N	158°26' W	75.3	10	20	72.3	65.3	1022	03	3,4	2	7	4	07	4
10	2030	1/12	21°40'N	158°16' W	75.2	10	20	74.0	64.2	1020	02	3,4	2	7	4	07	4
11	2137	1/12	21°43'N	158°07' W	75.0	10	17	75.5	64.5	1006	02	3,4	3	7	4	06	4
12	2300	1/12	21°47'N	157°56' W	74.7	10	20	76.0	66.5	1019	02	3,4	3	7	5	08	4
13	0045	1/13	21°57'N	157°56' W	74.8	07	19	79.9	68.3	1006	03	3,4	4	7	5	08	4
14	0155	1/13	22°07'N	157°56' W	75.6	11	20	73.0	65.0	1020	03	3,4	3	7	5	08	5
15	0310	1/13	22°17'N	157°56' W	74.4	09	17	73.0	65.2	1021	02	3,4	3	7	5	10	5
16	0440	1/13	22°16'N	157°47' W	74.0	06	17	73.5	64.0	1002	XX	X	X	X	4	10	5
17	0630	1/13	22°06'N	157°47' W	74.0	10	19	72.0	64.5	1019	01	1	3	7	4	09	4
18	0800	1/13	21°28'N	157°46' W	74.4	10	22	73.0	64.5	1019	01	X	X	X	4	09	4
19	0910	1/13	21°46'N	157°44' W	74.3	10	17	75.0	65.7	1019	02	X	X	X	5	09	4
20	1035	1/13	21°37'N	157°46' W	74.3	09	18	72.5	65.7	1018	02	X	X	X	5	09	4
21	1730	1/13	20°53'N	157°13' W	74.3	09	02	72.5	64.0	1016	01	4,1	2	8	1	XX	X
22	2330	1/13	20°12'N	156°48' W	74.5	09	18	73.8	65.4	1014	03	0	5	8	3	06	1
23	0530	1/14	19°31'N	156°18' W	74.9	09	01	74.6	65.2	1014	03	6	9	7	1	04	1
24	1130	1/14	18°44'N	155°53' W	74.7	09	21	72.0	66.3	1014	00	X	X	X	2	12	3
25	1700	1/14	17°55'N	155°27' W	75.4	08	16	73.0	65.5	1012	03	6,8	6	5	3	09	1
26	2330	1/14	17°08'N	155°02' W	75.9	02	10	75.9	68.0	XXX	03	6	7	6	3	05	2
27	0530	1/15	16°25'N	154°32' W	75.8	10	11	75.3	68.2	1012	15	6,9	6	9	2	08	1
28	1135	1/15	15°43'N	154°01' W	75.8	13	11	75.0	70.3	1011	01	6,8	4	9	2	08	1
29	1730	1/15	15°11'N	153°36' W	75.4	13	11	76.0	71.9	1011	03	6,8	8	8	3	11	2
30	2330	1/15	14°19'N	153°01' W	75.3	09	19	77.2	71.8	1009	02	5,8	6	8	3	09	2
31	0530	1/16	13°34'N	152°37' W	75.9	11	16	77.9	74.0	1010	02	X	X	8	3	09	2
32	1130	1/16	12°50'N	152°13' W	75.8	11	15	77.0	74.1	1010	02	X	X	7	4	10	2
33	1730	1/16	12°05'N	151°49' W	76.4	10	16	78.0	73.9	1011	01	4,6	7	8	3	10	3
34	2030	1/16	11°42'N	151°37' W	76.7	08	14	78.7	74.6	1015	02	4,8	5	8	3	09	3
35	2330	1/16	11°20'N	151°26' W	76.9	09	13	79.0	74.5	1011	02	4,6	5	8	3	09	3

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
36	0230	1/17	10°58'N	151°14'W	77.0	09	14	79.0	74.7	1010	02	4,6	5	8	3	09	3
37	0530	1/17	10°37'N	151°02'W	76.7	08	16	78.0	74.6	1012	02	X	3	8	3	09	3
38	0830	1/17	10°17'N	150°51'W	76.8	06	16	78.0	74.7	1012	02	X	3	8	3	09	3
39	1130	1/17	09°55'N	150°40'W	78.1	07	22	78.9	74.9	1011	00	8	6	8	3	10	3
40	1430	1/17	09°34'N	150°28'W	78.5	07	22	79.0	74.9	1010	01	8	3	9	3	10	3
41	1730	1/17	09°13'N	150°17'W	79.2	08	21	80.2	75.0	1012	02	6,8	3	9	4	07	4
42	2030	1/17	08°52'N	150°06'W	80.2	06	20	81.0	76.8	1012	02	6	6	9	4	07	4
43	2330	1/17	08°30'N	149°52'W	80.0	04	20	81.0	76.4	1010	03	6	9	9	4	07	4
44	0230	1/18	08°10'N	149°37'W	80.4	07	22	81.2	76.5	1008	03	6	6	8	4	07	4
45	0530	1/18	07°50'N	149°22'W	80.0	07	13	80.0	76.2	1010	81	X	X	X	4	06	3
46	0830	1/18	07°30'N	149°06'W	79.3	10	13	74.7	72.0	1011	80	X	X	X	3	07	3
47	1130	1/18	07°10'N	148°50'W	79.0	14	30	77.2	77.0	1010	82	X	X	0	4	07	3
48	1430	1/18	06°50'N	148°37'W	80.0	10	15	77.0	74.2	1009	01	X	X	8	4	09	3
49	1730	1/18	06°30'N	148°20'W	79.2	12	12	78.7	75.3	1010	01	6	8	6	3	07	4
50	2030	1/18	06°10'N	148°06'W	78.8	08	12	79.0	75.5	1010	03	6	8	5	3	07	4
51	2330	1/18	05°48'N	147°50'W	78.7	11	11	80.1	76.2	1008	01	2,4,2	5	9	3	11	3
52	0230	1/19	05°28'N	147°36'W	79.7	XX	XX	80.5	76.1	1008	03	6,8,4	6	9	3	11	3
53	0530	1/19	05°08'N	147°22'W	80.0	15	07	80.0	76.2	1010	00	X	X	9	3	11	3
54	0830	1/19	04°46'N	147°07'W	80.0	12	08	79.0	75.2	1010	16	X	X	9	3	11	2
55	1130	1/19	04°25'N	146°52'W	79.7	15	13	79.3	75.2	1009	01	X	5	6	3	11	2
56	1430	1/19	04°04'N	146°38'W	77.7	15	14	78.9	73.3	1008	03	X	8	6	3	11	1
57	1740	1/19	03°42'N	146°22'W	78.3	15	15	79.1	71.6	1010	02	1,6,4	5	9	2	11	1
58	2030	1/19	03°25'N	146°11'W	78.1	13	15	79.8	71.7	1011	03	6	7	9	2	11	1
59	2330	1/19	03°04'N	145°58'W	78.5	14	15	79.3	72.2	1010	02	6	7	9	2	11	1
60	0230	1/20	02°44'N	145°47'W	78.5	13	14	78.5	72.2	1008	02	4,6	5	9	2	11	1
61	0530	1/20	02°23'N	145°34'W	78.3	15	12	78.1	72.0	1010	01	X	4	7	3	11	1
62	0830	1/20	02°02'N	145°26'W	77.8	12	12	77.8	71.9	1012	00	X	3	7	3	11	1
63	1130	1/20	01°42'N	145°15'W	76.7	09	10	76.9	71.3	1010	00	8	1	X	3	11	1
64	1430	1/20	01°21'N	145°04'W	76.4	09	10	76.3	71.2	1010	00	8	2	X	3	11	1
65	1730	1/20	01°00'N	144°54'W	76.3	11	12	77.5	72.5	1012	02	8	3	9	3	07	1
66	2030	1/20	00°39'N	144°43'W	76.0	12	12	77.5	71.7	1013	01	8	2	9	3	07	1
67	2330	1/20	00°18'N	144°30'W	76.7	12	12	78.7	72.5	1011	03	8	5	9	3	07	1
68	0230	1/21	00°04'S	144°15'W	77.2	12	15	77.5	72.0	1010	01	8	2	9	3	09	1
69	0530	1/21	00°25'S	144°00'W	76.4	10	15	77.1	72.7	1011	02	8	1	X	3	09	1
70	0830	1/21	00°48'S	143°48'W	76.5	11	13	77.1	73.0	1012	00	X	X	X	3	XX	1

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
71	1130	1/21	01°12'S	143°36'W	77.0	10	13	77.0	73.0	1011	00	X	X	X	3	09	2
72	1430	1/21	01°36'S	143°25'W	76.9	08	13	77.6	73.3	1011	00	X	X	X	3	09	2
73	1730	1/21	02°00'S	143°14'W	77.8	10	15	79.3	74.4	1013	03	8	4	9	3	10	1
74	2030	1/21	02°23'S	143°03'W	78.3	12	12	82.1	75.1	1013	03	8	6	8	3	10	1
75	2330	1/21	02°49'S	142°51'W	78.1	11	18	79.0	71.8	1010	01	8	4	9	3	09	3
76	0230	1/22	03°12'S	142°40'W	78.3	11	16	79.1	73.5	1010	01	8	2	9	3	09	3
77	0530	1/22	03°36'S	142°30'W	78.3	09	17	77.5	72.3	1012	00	X	X	X	3	09	3
78	0830	1/22	04°00'S	142°20'W	78.3	10	14	80.0	73.0	1012	00	X	X	X	3	09	3
79	1130	1/22	04°23'S	142°10'W	78.2	10	14	79.0	72.2	1010	00	X	X	X	3	09	3
80	1430	1/22	04°48'S	142°00'W	78.0	09	12	78.5	71.5	1010	00	X	4	X	3	09	5
81	1730	1/22	05°10'S	141°49'W	78.4	07	14	78.9	71.7	1012	01	8	2	9	3	08	3
82	2030	1/22	05°35'S	141°38'W	78.6	06	14	79.1	72.6	1012	02	8	2	9	3	08	3
83	2330	1/22	05°59'S	141°28'W	78.3	08	16	80.0	74.2	1010	02	6,8	9	7	3	10	3
84	0230	1/23	06°24'S	141°17'W	78.9	08	13	80.2	74.2	1010	01	6,8	4	9	3	10	3
85	0530	1/23	06°50'S	141°08'W	79.0	07	13	80.0	72.9	1012	03	X	6	8	3	09	4
86	0830	1/23	07°15'S	140°58'W	78.8	07	12	79.5	73.5	1012	02	X	5	8	3	09	4
87	1130	1/23	07°40'S	140°50'W	79.2	06	14	79.6	73.6	1010	00	8	2	X	3	07	3
88	1430	1/23	08°05'S	140°42'W	79.5	08	16	79.6	73.8	1010	03	8	3	X	3	09	3
89	1730	1/23	08°27'S	140°31'W	80.9	05	16	82.5	73.2	1013	02	8	3	9	4	07	3
90	1730	1/25	09°12'S	140°07'W	80.7	08	16	80.0	71.7	1015	01	8	3	8	3	08	3
91	2330	1/25	09°28'S	140°00'W	81.2	05	16	82.2	73.2	1012	03	8	6	9	3	07	3
92	1730	1/26	09°28'S	140°06'W	80.8	09	16	80.9	73.3	1013	01	8	3	9	2	07	2
93	2025	1/26	09°34'S	139°55'W	81.2	01	14	82.2	74.9	1012	01	8	4	8	3	07	1
94	2330	1/26	09°40'S	139°29'W	81.7	07	12	82.0	74.5	1010	02	8	4	9	3	07	2
95	1820	1/27	09°58'S	139°01'W	81.0	07	04	82.2	74.3	1013	03	8	8	8	1	07	1
96	1915	1/27	10°02'S	139°11'W	80.8	05	08	80.0	74.3	1013	25	8	8	7	1	07	1
97	2330	1/27	10°24'S	138°45'W	81.3	05	10	80.3	75.1	1013	03	8	8	7	3	06	2
98	0055	1/28	10°27'S	138°44'W	81.3	15	06	83.8	75.2	1010	02	8	7	8	3	06	2
99	1735	1/28	09°28'S	138°53'W	80.8	07	04	82.0	74.0	1013	02	8	3	8	2	07	2
100	2330	1/28	09°01'S	139°36'W	82.3	03	07	84.0	75.9	1010	02	9,8	4	8	2	09	2
101	1730	1/29	08°50'S	139°16'W	80.7	07	14	80.3	73.0	1012	02	8	3	8	3	07	3
102	2330	1/29	08°16'S	139°30'W	81.6	07	13	80.2	75.0	1010	02	8	4	8	4	07	4
103	1540	1/30	07°52'S	140°01'W	80.6	06	13	79.8	72.7	1012	01	8	3	8	3	07	4
104	1730	1/30	07°47'S	140°16'W	80.2	07	14	79.5	73.6	1013	02	8	4	8	3	07	4
105	1905	1/30	07°48'S	140°25'W	80.3	07	13	82.1	75.1	1012	02	8	3	8	3	07	4

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
106	2330	1/30	08°10'S	140°38'W	81.0	06	13	81.5	73.4	1009	02	8	2	8	3	07	4
107	1815	1/31	08°45'S	140°06'W	80.9	05	08	83.4	75.5	1012	02	8,9	6	8	3	06	1
108	1823	2/2	09°19'S	140°10'W	81.3	07	12	81.5	74.7	1011	02	8	5	8	3	06	2
109	2225	2/2	09°33'S	140°08'W	82.0	06	11	82.5	74.7	1009	02	8	3	8	2	10	1
110	1730	2/3	09°28'S	140°05'W	81.6	21	04	81.0	73.1	1010	01	8	2	8	2	15	1
111	2330	2/3	09°50'S	140°18'W	82.2	05	10	82.7	74.4	1008	03	8	3	8	3	03	1
112	1915	2/4	09°22'S	139°58'W	81.0	08	11	82.2	73.8	1010	02	8	3	8	4	08	4
113	1750	2/5	08°52'S	139°56'W	81.2	11	14	82.6	76.4	1012	03	6	8	8	3	09	3
114	0140	2/8	08°57'S	140°14'W	81.3	15	18	83.0	75.1	1006	02	6	8	8	2	09	3
115	1135	2/10	09°01'S	140°12'W	80.7	27	05	81.2	74.6	1008	02	8	1	X	3	XX	1
116	1730	2/10	09°38'S	140°55'W	81.8	09	07	84.5	75.5	1010	02	8	2	8	2	09	2
117	2330	2/10	10°13'S	141°37'W	82.0	04	06	83.1	75.2	1008	01	8	2	9	2	13	1
118	0530	2/11	10°44'S	142°15'W	81.8	03	06	83.0	75.0	1010	02	8	2	9	2	13	1
119	1130	2/11	11°16'S	142°52'W	80.9	07	09	81.2	73.8	1008	02	X	4	9	2	XX	1
120	1730	2/11	11°48'S	143°32'W	82.5	07	06	84.5	75.0	1011	02	8	3	9	1	13	1
121	2330	2/11	12°21'S	144°11'W	84.3	11	03	84.9	74.8	1009	02	8	5	9	1	11	2
122	0530	2/12	12°57'S	144°50'W	84.2	10	06	84.5	74.5	1010	01	8	1	9	1	13	2
123	1130	2/12	13°33'S	145°28'W	82.8	15	06	83.8	74.5	1008	02	8	1	9	1	11	2
124	1730	2/12	14°08'S	146°04'W	83.5	04	07	84.2	74.5	1010	02	8	1	9	1	11	2
125	2155	2/12	14°38'S	146°08'W	83.9	02	13	84.0	76.0	1009	02	8	1	9	1	09	1
126	2250	2/12	14°41'S	146°06'W	84.5	02	12	84.5	75.2	1009	02	8	1	9	1	09	1
127	0020	2/13	14°40'S	146°25'W	84.8	02	09	85.0	75.5	1008	01	8	2	9	2	09	1
128	0530	2/13	14°54'S	146°36'W	82.5	00	06	82.0	75.0	1010	02	8	2	9	2	00	1
129	1730	2/13	15°40'S	146°32'W	83.0	13	03	82.5	74.0	1011	02	8	1	9	1	00	1
130	2015	2/13	15°54'S	146°22'W	83.5	07	04	84.0	75.0	1011	01	8	1	9	1	10	2
131	2340	2/13	16°06'S	146°50'W	86.4	23	01	85.7	76.3	1010	15	1,8,9	5	9	0	20	5
132	0530	2/14	16°27'S	147°48'W	83.7	06	04	83.0	75.5	1011	15	1,8,9	4	9	0	18	5
133	1130	2/14	16°57'S	148°39'W	83.3	19	11	82.2	76.0	1009	15	1,4,9	6	9	1	14	1
134	0530	2/20	14°57'S	146°20'W	84.0	07	09	84.3	76.5	1011	00	X	X	9	1	14	1
135	1335	2/20	14°18'S	145°32'W	83.5	07	08	83.5	76.1	1010	00	9	6	9	2	XX	1
136	0530	2/21	12°48'S	143°55'W	83.8	05	06	80.0	80.0	1011	00	X	X	9	2	XX	1
137	1340	2/21	12°05'S	143°06'W	82.0	07	11	81.2	74.1	1011	15	X	6	8	2	XX	1
138	0530	2/22	10°39'S	141°33'W	82.2	10	11	83.0	75.0	1013	00	X	X	8	2	10	2
139	1340	2/22	09°56'S	141°03'W	82.2	10	12	81.1	75.8	1010	02	X	2	8	2	XX	1
140	1817	2/23	09°16'S	140°07'W	81.6	12	12	81.9	75.1	1014	02	8	6	8	3	12	2

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
141	2335	2/23	09°27'S	139°59' W	82.1	06	12	82.2	74.2	1012	01	8	2	8	3	08	1
142	1750	2/24	09°32'S	139°54' W	81.8	06	06	82.3	75.0	1015	01	8	2	8	2	06	1
143	2340	2/24	09°48'S	139°23' W	83.1	07	05	82.0	75.1	1012	03	8	6	9	2	07	1
144	0150	2/25	09°50'S	139°14' W	83.5	03	03	82.7	75.9	1012	02	8	5	8	1	03	2
145	2335	2/25	10°13'S	138°54' W	84.4	06	07	82.7	74.9	1011	03	6,8	4	9	1	06	1
146	0140	2/26	10°18'S	138°45' W	83.7	07	11	82.0	75.8	1011	02	8	4	9	1	07	2
147	1730	2/26	10°21'S	138°38' W	82.0	06	05	83.2	74.8	1014	02	8	1	9	1	18	2
148	0005	2/27	09°40'S	138°46' W	84.6	33	04	83.0	75.1	1010	02	8	1	8	1	10	2
149	0140	2/27	09°41'S	138°54' W	84.6	00	04	83.2	75.0	1010	02	8	1	8	1	10	2
150	0530	2/28	09°22'S	139°37' W	82.8	06	07	83.5	74.5	1012	00	X	X	X	1	XX	X
151	2330	2/28	08°24'S	140°34' W	83.5	06	08	83.3	76.1	1010	03	8	5	8	1	05	2
152	1830	3/1	07°50'S	140°28' W	81.8	12	10	83.0	75.8	1013	01	8	3	8	2	35	2
153	2115	3/1	07°57'S	140°18' W	82.3	07	10	81.5	76.0	1012	02	8	3	8	2	35	4
154	0645	3/3	08°57'S	139°57' W	82.5	00	15	83.0	75.5	1012	02	X	X	8	2	00	2
155	1730	3/3	08°47'S	139°58' W	81.5	00	11	82.0	75.0	1013	03	3,8	8	8	3	00	2
156	0005	3/4	09°00'S	140°08' W	82.3	31	07	84.5	74.5	1010	03	2,8	10	8	3	31	2
157	1833	3/4	09°00'S	140°06' W	82.7	09	04	83.3	75.0	1012	01	8	3	8	1	09	2
158	2200	3/4	08°58'S	140°21' W	83.1	01	11	82.9	75.3	1010	02	8	1	8	2	01	1
159	2350	3/4	08°49'S	140°29' W	83.1	05	08	82.8	75.0	1010	02	8	2	8	2	04	1
160	1615	3/5	08°47'S	140°14' W	82.2	08	14	81.7	75.4	1010	02	8	2	8	2	08	2
161	1755	3/5	08°46'S	140°15'W	82.1	05	12	82.0	76.0	1011	03	8	6	8	3	08	1
162	2330	3/5	08°46'S	140°22' W	82.6	06	15	82.5	75.0	1009	02	8	5	8	3	06	2
163	0105	3/6	08°52'S	140°20' W	82.0	03	16	83.0	75.0	1008	02	8	5	8	3	06	2
164	1740	3/6	09°11'S	139°52' W	82.5	10	14	82.6	75.5	1012	02	1,8	4	8	3	09	1
165	2240	3/6	09°34'S	139°30' W	83.1	07	11	83.3	75.4	1011	02	1,8	3	8	3	07	2
166	0015	3/7	09°36'S	139°27' W	82.7	08	16	82.9	75.9	1010	02	1,8	3	8	3	07	2
167	1800	3/7	09°48'S	139°11' W	83.0	04	04	83.0	76.0	1015	02	8	3	8	1	06	2
168	2340	3/7	09°16'S	139°45' W	83.9	05	11	84.7	77.3	1010	01	8	2	8	2	04	1
169	1740	3/8	09°01'S	140°09' W	83.0	09	12	82.8	77.2	1012	15	9	6	8	2	12	1
170	2300	3/8	09°06'S	140°19' W	83.8	11	10	84.8	78.0	1010	02	1,8	7	8	2	11	1
171	0110	3/9	09°08'S	140°12' W	83.0	07	10	83.8	76.3	1010	02	1,8	7	8	1	10	1
172	2125	3/9	09°02'S	140°10' W	83.1	09	12	83.3	76.5	1011	02	2,8	3	8	2	09	2
173	2335	3/12	08°41'S	140°22' W	83.3	07	11	83.3	76.3	1010	02	8	1	8	3	07	1
174	0235	3/13	08°18'S	140°34' W	82.4	07	10	82.7	76.6	1010	02	8	1	8	2	07	1
175	0530	3/13	07°56'S	140°46' W	81.5	09	12	83.8	77.0	1014	02	8	1	8	2	09	2

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
176	0830	3/13	07°32'S	140°58' W	81.5	09	11	84.0	77.8	1012	02	8	3	8	2	09	2
177	1130	3/13	07°09'S	141°11' W	81.5	09	11	81.5	76.1	1010	02	8	1	8	2	05	1
178	1430	3/13	06°46'S	141°23' W	81.1	09	10	81.5	76.0	1010	00	8	1	8	2	XX	1
179	1730	3/13	06°22'S	141°35' W	81.2	10	12	83.6	76.8	1012	02	8	2	8	2	10	2
180	2043	3/13	05°58'S	141°48' W	81.6	10	10	83.0	77.0	1011	02	8	3	8	2	10	2
181	2330	3/13	05°36'S	141°59' W	82.2	09	11	82.8	77.2	1008	03	8	5	8	2	09	1
182	0230	3/14	05°13'S	142°12' W	81.5	09	09	81.7	76.8	1008	01	8	3	8	2	09	2
183	0530	3/14	04°51'S	142°24' W	80.8	13	10	83.0	77.3	1013	02	8	3	8	2	09	2
184	0830	3/14	04°27'S	142°37' W	80.8	13	09	83.5	77.0	1012	02	8	4	8	2	13	2
185	1130	3/14	04°04'S	142°51' W	80.9	12	09	81.0	76.2	1010	01	8	1	X	2	12	2
186	1430	3/14	03°41'S	143°04' W	80.6	09	07	81.0	76.4	1010	00	8	1	X	2	XX	2
187	1730	3/14	03°18'S	143°16' W	81.1	09	08	82.0	76.8	1012	02	8	5	8	2	11	2
188	2030	3/14	02°56'S	143°28' W	81.0	07	10	82.8	77.0	1012	02	8	5	8	2	09	2
189	2332	3/14	02°35'S	143°40' W	81.7	05	10	82.2	76.6	1008	02	8	6	8	2	05	1
190	0230	3/15	02°14'S	143°53' W	81.1	06	07	81.3	75.8	1008	02	8	4	8	2	03	1
191	0530	3/15	01°52'S	144°06' W	80.5	07	10	82.3	76.0	1010	02	8	2	8	2	09	2
192	0830	3/15	01°30'S	144°19' W	80.0	11	09	82.6	76.6	1011	02	8	3	8	2	10	2
193	1130	3/15	01°08'S	144°31' W	79.1	07	07	79.3	75.0	1010	00	8	3	9	2	XX	2
194	1430	3/15	00°47'S	144°43' W	79.0	08	06	79.0	74.5	1010	01	8	1	9	1	XX	2
195	1745	3/15	00°25'S	144°56' W	79.5	08	08	82.3	76.0	1012	02	8	2	9	1	02	3
196	2030	3/15	00°04'S	145°08' W	81.2	09	04	82.5	75.5	1012	02	8	2	9	1	06	3
197	2330	3/15	00°20'N	145°20' W	83.5	09	05	82.0	75.0	1009	01	8	4	9	1	03	3
198	0230	3/16	00°44'N	145°34' W	83.5	00	00	82.7	75.0	1009	15	8	3	9	0	00	3
199	0530	3/16	01°08'N	145°46' W	81.6	00	00	82.0	74.8	1011	15	8	3	9	0	06	3
200	0830	3/16	01°33'N	145°59' W	80.9	01	04	82.0	75.0	1012	02	8	3	9	0	03	2
201	1130	3/16	01°57'N	146°12' W	81.1	00	00	81.0	74.3	1010	02	8	1	9	0	03	2
202	1430	3/16	02°22'N	146°25' W	80.8	25	06	80.4	75.4	1010	02	8	1	9	1	01	2
203	1730	3/16	02°46'N	146°38' W	80.0	28	06	81.8	75.6	1013	15	8	3	9	1	00	2
204	2030	3/16	03°11'N	146°52' W	81.9	25	03	83.5	76.3	1014	15	8,9	2	9	1	01	2
205	2335	3/16	03°36'N	147°03' W	84.7	33	02	83.0	75.9	1011	15	4,8	4	9	1	01	3
206	0230	3/17	03°59'N	147°14' W	82.1	08	12	79.9	76.0	1011	03	4,8	7	8	3	00	1
207	0530	3/17	04°22'N	147°24' W	80.0	07	12	80.0	75.5	1013	03	4,8	7	8	3	03	1
208	0830	3/17	04°45'N	147°35' W	80.1	08	15	80.5	75.5	1014	03	6	9	8	3	03	2
209	1130	3/17	05°09'N	147°44' W	80.1	09	14	79.1	75.0	1012	01	4	7	X	3	03	3
210	1430	3/17	05°32'N	147°56' W	80.0	11	13	79.3	75.0	1011	01	8	1	X	3	07	3

Table 3.--Observations at bathythermograph lowerings, Charles H. Gilbert cruise 32 (coded according to H.O. Pub. 606-c, second edition, 1956) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell	
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.
211	1730	3/17	05°55'N	148°05'W	80.5	20	07	82.8	76.2	1013	02	8	2	8	3	06	3
212	2030	3/17	06°18'N	148°16'W	82.0	00	00	82.8	75.0	1013	02	6,8	1	9	2	05	3
213	2330	3/17	06°40'N	148°28'W	83.7	00	00	82.8	75.7	1010	01	1	1	9	2	05	3
214	0230	3/18	06°59'N	148°41'W	83.7	09	03	81.9	75.0	1010	01	8	2	9	2	05	3
215	0530	3/18	07°19'N	148°55'W	81.8	08	07	82.8	75.3	1012	01	6	2	9	2	05	3
216	0830	3/18	07°38'N	149°09'W	80.0	08	07	82.3	76.2	1013	03	6	8	8	2	03	3
217	1130	3/18	07°58'N	149°23'W	80.0	09	10	80.4	75.7	1010	15	8	7	8	2	04	3
218	1430	3/18	08°18'N	149°38'W	79.2	04	17	76.1	74.9	1010	60	0	9	X	3	XX	X
219	1730	3/18	08°38'N	149°52'W	78.0	04	18	78.0	74.8	1012	02	6	9	8	3	05	3
220	2030	3/18	08°57'N	150°06'W	78.8	05	18	79.8	75.3	1012	02	6	9	8	3	05	3
221	2330	3/18	09°17'N	150°19'W	79.1	06	16	79.2	74.8	1010	02	0,4,8	7	8	4	06	3
222	0310	3/19	09°43'N	150°35'W	78.9	06	13	78.5	73.9	1010	15	0,8,9	7	8	4	02	3
223	0530	3/19	10°00'N	150°45'W	78.1	07	17	79.0	74.5	1011	01	8	2	8	4	06	3
224	0830	3/19	10°20'N	150°58'W	78.0	03	15	74.0	74.0	1012	21	X	X	0	5	07	3
225	1130	3/19	10°42'N	151°11'W	78.0	05	17	75.9	72.7	1011	60	0	7	X	4	XX	3
226	1430	3/19	11°02'N	151°22'W	77.6	05	15	77.1	71.6	1010	01	8	1	9	4	05	3
227	1730	3/19	11°24'N	151°35'W	77.3	04	14	77.5	72.5	1013	01	8	2	9	4	05	3
228	2328	3/19	12°06'N	152°01'W	78.1	04	13	77.3	73.1	1012	15	8	7	8	4	03	3
229	0530	3/20	12°50'N	152°25'W	76.9	05	14	77.9	72.6	1013	01	8	3	8	3	03	3
230	1130	3/20	13°34'N	152°49'W	76.3	07	14	75.5	71.0	1013	00	9	6	X	3	04	3
231	1730	3/20	14°19'N	153°13'W	75.3	06	14	76.0	70.3	1014	15	6,8	6	8	3	04	2
232	2330	3/20	15°03'N	153°38'W	76.8	07	10	76.9	70.4	1013	02	8	5	9	2	04	1
233	0530	3/21	15°48'N	154°10'W	75.5	05	10	76.0	68.8	1014	01	0	0	9	2	04	1
234	1130	3/21	16°33'N	154°42'W	75.0	08	06	74.0	66.9	1015	02	8	1	9	2	04	1
235	1730	3/21	17°17'N	155°40'W	74.1	03	03	74.0	67.0	1016	02	8	1	9	2	04	1
236	2330	3/21	18°01'N	155°46'W	75.2	15	06	76.0	67.2	1014	02	8	1	9	2	09	2
237	0530	3/22	18°46'N	156°14'W	75.0	XX	00	74.3	65.2	1015	02	8	1	9	2	09	2
238	1130	3/22	19°30'N	156°42'W	74.6	27	05	73.3	67.2	1014	02	8	1	9	1	00	0
239	1730	3/22	20°14'N	157°10'W	73.8	00	13	73.3	66.2	1014	15	0,6	9	8	1	33	1
240	2330	3/22	20°52'N	157°44'W	74.0	32	06	72.0	63.5	1013	02	2,5,8	9	8	1	35	1

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H. O. Pub. 606-c, first edition, 1951)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
1	1800	1/6	18°26'N	154°56'W	75.5	085	24	74.5	71.0	1018	02	8	3	8	4	-	-	-
2	0000	1/7	18°08'N	154°24'W	75.5	080	24	77.5	73.2	1016	03	0,8	8	8	4	-	-	34.65
3	0600	1/7	17°51'N	153°58'W	75.8	080	25	74.5	69.5	1017	01	8	5	8	4	-	-	-
4	1200	1/7	17°36'N	153°32'W	75.5	080	26	75.0	71.0	1017	XX	X	X	X	4	-	-	34.42
5	1750	1/7	17°21'N	153°05'W	76.0	085	24	70.4	65.0	1020	03	8	7	8	4	-	-	-
6	0000	1/8	17°08'N	152°39'W	76.0	045	24	74.6	69.5	1016	02	6,8	7	8	4	-	-	34.67
7	0600	1/8	16°52'N	152°07'W	75.9	050	23	73.0	68.5	1016	02	6,8	6	8	4	-	-	-
8	1200	1/8	16°28'N	151°38'W	75.0	060	22	72.0	66.6	1015	01	8	3	8	4	-	-	35.17
9	1800	1/8	16°03'N	151°08'W	75.2	060	24	73.0	67.5	1017	01	8	3	8	4	-	-	-
10	0000	1/9	15°47'N	150°37'W	75.3	060	23	76.2	69.1	1013	01	8	2	8	4	-	-	34.92
11	0600	1/9	15°28'N	150°05'W	75.7	060	25	73.2	67.8	1015	03	6	6	8	3	-	-	-
12	1200	1/9	15°10'N	149°32'W	76.0	060	26	74.0	68.0	1013	01	6	2	8	3	-	-	34.25
13	1800	1/9	14°52'N	148°58'W	76.4	050	20	73.3	68.5	1014	03	0,8	7	8	3	-	-	-
14	0000	1/10	14°35'N	148°25'W	76.3	055	18	75.6	69.0	1012	15	0,8	9	8	3	-	-	34.27
15	0600	1/10	14°18'N	147°50'W	76.5	050	19	74.0	68.5	1012	02	0,8	9	8	3	-	-	-
16	1200	1/10	14°02'N	147°16'W	76.4	080	19	73.5	70.0	1012	02	0,8	9	8	3	-	-	34.13
17	1800	1/10	13°46'N	146°42'W	77.0	090	15	72.9	69.0	1014	20	6	8	8	3	-	-	-
18	0000	1/11	13°28'N	146°10'W	76.9	090	11	75.1	70.6	1011	02	0,6	8	8	3	-	-	34.22
19	0600	1/11	13°09'N	145°38'W	76.5	125	16	75.5	67.5	1014	50	0,6	8	7	3	-	-	-
20	1200	1/11	12°49'N	145°05'W	76.2	125	14	75.8	71.1	1012	02	6	8	7	3	-	-	34.38
21	1800	1/11	12°30'N	144°34'W	76.2	045	29	72.1	69.2	1016	51	6	8	6	3	-	-	-
22	0000	1/12	12°10'N	144°01'W	76.3	055	22	73.0	68.7	1012	02	0,6	8	7	3	-	-	34.25
23	0600	1/12	11°47'N	143°23'W	76.3	055	19	75.5	70.5	1014	01	0,6	7	8	3	-	-	-
24	1200	1/12	11°26'N	142°47'W	76.3	010	09	74.1	70.0	1012	02	8	3	8	3	-	-	33.69
25	1800	1/12	11°03'N	142°09'W	76.2	020	17	76.0	70.5	1015	02	4,8	4	8	3	-	-	-
26	0000	1/13	10°39'N	141°32'W	77.0	030	17	75.3	70.9	1011	02	8	4	8	2	-	-	34.02
27	0600	1/13	10°13'N	140°58'W	76.4	060	14	76.3	71.3	1012	03	5,6	8	8	2	-	-	-
28	1200	1/13	09°48'N	140°24'W	76.2	060	10	75.0	71.5	1010	02	6,8	8	8	2	-	-	33.64
29	1800	1/13	09°28'N	139°48'W	76.3	030	15	75.5	72.2	1012	02	6,8	7	8	2	-	-	-
30	0000	1/14	08°58'N	139°11'W	77.5	040	17	76.9	73.1	1008	01	4,8	4	8	3	-	-	33.78
31	0600	1/14	08°36'N	138°32'W	77.2	040	14	77.3	73.9	1010	03	4,8	7	8	2	-	-	-
32	1200	1/14	08°14'N	137°51'W	79.0	060	16	77.3	74.8	1008	01	8	4	8	2	-	-	34.36
33	1800	1/14	07°48'N	137°05'W	79.7	060	16	80.0	73.5	1011	01	8	2	8	3	-	-	-
34	0000	1/15	07°20'N	136°23'W	81.0	060	15	81.2	74.9	1007	02	8	2	8	3	-	-	34.85
35	0600	1/15	06°50'N	135°45'W	79.9	050	12	80.0	74.2	1010	02	8	3	8	2	-	-	-

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
36	1200	1/15	06°20'N	135°09'W	79.5	065	12	79.0	74.0	1008	02	8	2	8	2	-	-	34.92
37	1800	1/15	05°52'N	134°32'W	79.0	060	10	79.7	75.5	1010	02	4,8	4	8	2	-	-	-
38	0000	1/16	05°26'N	133°55'W	80.7	100	09	79.1	74.6	1007	01	4,8	4	8	2	-	-	34.79
39	0600	1/16	05°02'N	133°21'W	80.0	110	08	79.5	75.5	1010	03	4,8	6	8	2	-	-	-
40	1200	1/16	04°38'N	132°41'W	78.6	130	08	78.4	74.2	1004	02	4,8	6	8	2	-	-	34.96
41	1528	1/16	04°22'N	132°22'W	79.0	130	13	76.1	74.1	1010	25	6	7	7	2	-	-	-
42	2115	1/16	04°29'N	132°17'W	79.4	100	17	80.0	75.0	1010	03	4,8	5	8	3	-	-	35.01
43	0305	1/17	04°25'N	132°13'W	79.3	100	14	78.3	74.6	1009	03	4,8	8	8	3	-	-	-
44	0821	1/17	03°51'N	132°12'W	78.8	090	13	77.5	74.5	1011	02	4,8	7	8	2	-	-	34.88
45	1555	1/17	03°24'N	132°14'W	76.4	130	12	77.9	73.5	1009	01	8	7	7	2	-	-	-
46	2116	1/17	03°34'N	132°06'W	76.7	130	18	78.9	74.0	1010	02	4,5	5	8	3	-	-	34.85
47	0138	1/18	03°28'N	132°09'W	76.7	130	10	77.0	73.6	1009	02	5	4	8	2	-	-	-
48	1200	1/18	02°22'N	132°14'W	75.7	150	09	75.3	71.5	1009	01	0	1	8	2	-	-	34.74
49	1550	1/19	01°35'N	132°05'W	76.0	120	09	77.9	72.0	1010	01	6,8	2	8	2	-	-	-
50	2117	1/19	01°34'N	132°09'W	76.8	130	11	78.8	73.8	1010	01	8	1	8	2	-	-	34.67
51	0047	1/20	01°22'N	132°10'W	76.9	130	15	77.6	72.5	1008	03	4,8	6	8	2	-	-	-
52	0759	1/20	00°36'N	132°10'W	76.1	130	10	76.4	72.5	1012	02	6	6	8	2	-	-	34.65
53	1549	1/20	00°01'S	132°14'W	75.8	120	14	77.1	72.2	1012	01	4	2	8	2	-	-	-
54	2109	1/20	00°07'S	132°19'W	76.4	120	14	77.6	72.0	1011	03	5	6	8	2	-	-	34.74
55	0055	1/21	00°17'S	132°19'W	76.5	120	13	76.5	72.5	1009	01	5,8	1	8	2	-	-	-
56	0800	1/21	01°11'S	132°06'W	76.0	130	11	76.8	72.0	1012	02	8	1	8	2	-	-	34.87
57	1555	1/21	01°53'S	132°04'W	75.5	100	09	76.1	72.0	1012	02	4,8	2	8	2	-	-	-
58	2126	1/21	01°54'S	132°07'W	75.3	100	08	75.9	73.0	1012	03	4,8	5	8	2	-	-	34.88
59	0124	1/22	02°00'S	131°59'W	76.7	100	12	76.9	72.0	1010	02	4,8	2	8	2	-	-	-
60	0758	1/22	02°47'S	131°56'W	77.3	100	14	76.7	71.6	1012	02	8	2	8	2	-	-	35.34
61	1557	1/22	03°30'S	132°06'W	77.5	060	13	77.1	70.9	1012	02	8	3	8	2	-	-	-
62	2113	1/22	03°30'S	132°04'W	77.9	060	12	79.7	72.6	1012	02	8	1	8	2	-	-	35.23
63	0155	1/22	03°24'S	132°02'W	78.2	060	11	77.9	72.0	1010	03	8	3	8	2	-	-	-
64	0800	1/23	04°06'S	132°00'W	77.5	070	17	75.5	72.1	1012	00	0	0	8	2	-	-	35.25
65	1558	1/23	04°50'S	132°10'W	77.5	100	10	78.0	72.3	1013	03	8	3	8	2	-	-	-
66	2113	1/23	04°46'S	132°10'W	78.1	090	14	79.8	72.9	1012	01	8	1	8	2	-	-	35.28
67	0044	1/24	04°46'S	132°05'W	78.2	090	17	79.0	73.2	1010	03	8	3	8	2	-	-	-
68	0751	1/24	05°39'S	132°02'W	78.0	080	20	77.5	72.3	1013	01	8	1	8	2	-	-	35.34
69	1555	1/24	06°23'S	132°10'W	78.1	100	15	78.5	73.8	1014	03	8	5	8	2	-	-	-
70	2112	1/24	06°22'S	132°16'W	78.0	100	14	80.0	74.2	1012	02	8	4	8	2	-	-	35.35

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
71	0117	1/25	06°24'S	132°06'W	78.5	100	14	80.6	74.0	1010	02	8	3	8	2	-	-	-
72	0800	1/25	07°11'S	131°58'W	78.2	080	17	78.5	73.3	1014	00	0	0	8	2	-	-	35.30
73	1554	1/25	07°50'S	132°01'W	79.0	100	16	80.0	73.0	1014	03	8	3	8	3	-	-	-
74	2119	1/25	07°50'S	132°02'W	79.4	100	18	79.9	74.0	1013	03	8	2	8	3	-	-	35.48
75	0103	1/26	07°56'S	131°54'W	79.1	100	17	79.9	74.0	1011	03	8	3	8	3	-	-	-
76	0800	1/26	08°46'S	131°53'W	79.5	090	16	79.0	74.0	1013	01	8	1	8	3	-	-	35.53
77	1555	1/26	09°32'S	132°02'W	80.1	060	10	80.0	73.5	1014	03	8	4	8	2	-	-	-
78	2104	1/26	09°38'S	132°03'W	80.8	060	10	82.1	75.6	1012	02	8	4	8	2	-	-	35.64
79	0048	1/27	09°40'S	131°52'W	80.6	060	09	79.6	73.5	1010	02	8	2	8	2	-	-	-
80	0700	1/27	10°20'S	131°52'W	80.2	090	10	80.1	73.4	1012	01	8	1	8	2	-	-	35.79
81	1556	1/27	10°58'S	132°02'W	80.7	090	09	80.7	74.2	1012	03	8,5	2	8	2	-	-	-
82	2105	1/27	10°58'S	132°04'W	81.2	070	11	82.0	77.1	1012	03	8,4	3	8	2	-	-	35.93
83	0116	1/28	11°04'S	131°55'W	81.3	060	08	81.0	75.0	1010	03	8	5	8	2	-	-	-
84	0700	1/28	11°46'S	131°56'W	81.0	090	10	79.7	73.2	1014	01	8	2	8	2	-	-	35.93
85	1557	1/28	12°32'S	132°02'W	81.3	060	11	79.8	75.0	1014	03	8	6	8	2	-	-	-
86	2101	1/28	12°30'S	132°07'W	81.9	060	15	81.0	74.5	1014	02	8	3	8	2	-	-	35.93
87	0052	1/29	12°29'S	131°55'W	82.2	060	10	81.1	74.0	1011	01	5,8	3	8	2	-	-	-
88	0700	1/29	13°15'S	131°54'W	81.7	110	07	81.4	74.5	1014	01	8	1	8	2	-	-	35.82
89	1556	1/29	14°04'S	132°02'W	81.7	090	08	82.2	76.4	1013	03	8,5	3	8	2	-	-	-
90	2105	1/29	14°02'S	132°03'W	82.4	090	11	83.5	77.2	1012	03	5,8	6	8	2	-	-	35.97
91	0046	1/30	14°07'S	131°55'W	82.2	090	09	83.3	77.6	1010	02	8	6	8	2	-	-	-
92	0600	1/30	13°54'S	132°23'W	82.0	090	10	82.0	78.0	1014	13	5,8	4	8	2	-	-	-
93	1203	1/30	13°32'S	133°06'W	81.5	080	11	81.6	78.9	1010	13	6,8	4	8	1	-	-	35.86
94	1800	1/30	13°08'S	133°54'W	82.1	070	12	84.0	77.5	1013	03	5,8	6	8	2	-	-	-
95	0001	1/31	12°49'S	134°35'W	83.0	060	10	86.5	78.8	1010	03	5,8	7	8	2	-	-	36.15
96	0600	1/31	12°28'S	135°20'W	81.6	020	10	79.0	71.0	1012	13	5,8	8	7	2	-	-	-
97	1200	1/31	12°07'S	136°06'W	81.6	060	14	79.6	75.1	1010	01	5,8	5	7	2	-	-	35.95
98	1800	1/31	11°47'S	136°48'W	81.6	040	12	82.0	77.4	1013	15	5,8	8	8	2	-	-	-
99	0000	2/1	11°22'S	137°33'W	81.7	060	16	81.8	75.7	1010	03	5,8	5	8	2	-	-	35.88
100	0500	2/1	10°57'S	138°04'W	81.4	080	11	81.6	75.0	1011	01	8	1	8	2	-	-	-
101	1653	2/1	10°47'S	138°38'W	81.3	070	13	81.9	75.0	1012	01	8	2	8	2	-	-	-
102	2204	2/1	10°47'S	138°38'W	81.8	060	07	82.0	75.0	1010	02	8	2	8	2	-	-	35.86
103	0145	2/2	10°50'S	138°30'W	81.8	080	08	81.4	76.1	1009	02	8	3	8	2	-	-	-
104	0700	2/2	10°14'S	138°33'W	81.2	080	07	81.5	76.6	1010	02	8	3	8	2	-	-	35.86
105	1656	2/2	09°32'S	138°37'W	81.5	070	09	82.2	75.2	1010	02	8	2	8	1	-	-	-

Table 4. --Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
106	2210	2/2	09°31'S	138°39'W	82.5	060	07	82.1	75.4	1010	03	8	4	8	1	-	-	35.90
107	0159	2/3	09°35'S	138°28'W	82.2	060	08	82.0	75.3	1008	01	8,5	2	8	1	-	-	-
108	0600	2/3	09°06'S	138°26'W	81.0	060	14	80.5	74.5	1010	02	0	0	8	1	-	-	35.88
109	1653	2/3	08°34'S	138°34'W	80.9	050	10	82.1	76.4	1010	02	8,4	2	8	2	-	-	-
110	2205	2/3	08°34'S	138°34'W	80.4	050	13	82.3	75.1	1009	03	8,4,5	6	8	2	-	-	35.88
111	0142	2/4	08°34'S	138°27'W	81.4	070	10	81.9	75.6	1007	02	8,4	6	8	2	-	-	-
112	0600	2/4	08°03'S	138°24'W	80.4	090	13	80.5	74.9	1009	01	4,8	3	8	2	-	-	35.79
113	1708	2/4	07°33'S	138°38'W	80.2	090	14	81.2	75.0	1010	03	4,8	6	8	2	-	-	-
114	2208	2/4	07°35'S	138°38'W	80.4	080	13	80.5	75.0	1009	03	4,8	6	8	2	-	-	35.70
115	0148	2/5	07°41'S	138°30'W	80.5	080	14	81.0	76.0	1008	02	4,8	6	8	3	-	-	-
116	0500	2/5	07°36'S	138°54'W	80.2	080	14	80.5	75.5	1010	01	4,8	2	8	3	-	-	35.73
117	1658	2/5	07°30'S	139°34'W	80.7	090	18	80.7	76.1	1011	03	8	3	8	3	-	-	-
118	2202	2/5	07°31'S	139°36'W	81.0	090	19	82.2	76.0	1008	02	8	6	8	3	-	-	35.81
119	0144	2/6	07°36'S	139°25'W	81.1	090	16	81.2	77.2	1008	02	8	6	8	3	-	-	-
120	0600	2/6	08°06'S	139°22'W	80.6	090	19	80.3	76.0	1010	01	8	2	8	4	-	-	35.86
121	1655	2/6	08°28'S	139°36'W	80.8	090	18	81.1	76.2	1010	02	8	2	8	3	-	-	-
122	2203	2/6	08°26'S	139°39'W	81.2	090	17	82.5	76.7	1008	03	7	5	8	3	-	-	35.86
123	0145	2/7	08°32'S	139°28'W	81.3	090	16	81.3	77.0	1007	02	4,8	5	8	3	-	-	-
124	0554	2/7	09°01'S	139°24'W	81.2	090	13	81.0	77.0	1008	01	8	3	8	3	-	-	35.88
125	1654	2/7	09°32'S	139°38'W	81.4	060	15	81.9	76.1	1009	14	8	5	8	2	-	-	-
126	2206	2/7	09°30'S	139°38'W	81.7	070	14	83.5	77.8	1008	01	8	3	8	2	-	-	35.86
127	0235	2/8	09°30'S	139°32'W	81.6	070	17	81.5	76.9	1007	02	8	2	8	2	-	-	-
128	0700	2/8	10°01'S	139°28'W	81.3	100	14	81.3	76.1	1009	01	8	2	8	2	-	-	35.81
129	1651	2/8	10°23'S	139°38'W	81.5	070	13	81.4	76.0	1010	02	8	2	8	2	-	-	-
130	2205	2/8	10°22'S	139°40'W	81.8	070	14	84.1	76.5	1008	02	8	2	8	2	-	-	35.84
131	0227	2/9	10°27'S	139°30'W	81.8	080	10	80.6	76.1	1007	01	8	1	8	2	-	-	-
132	0725	2/9	09°56'S	139°58'W	81.8	090	12	81.6	77.4	1009	03	8	4	8	2	-	-	35.79
133	1653	2/9	09°18'S	140°33'W	81.4	080	14	82.5	76.1	1008	01	8	2	8	2	-	-	-
134	2209	2/9	09°14'S	140°34'W	81.7	070	12	82.9	76.8	1007	03	6,8	6	8	2	-	-	35.79
135	0215	2/10	09°20'S	140°28'W	81.6	070	12	X	X	1006	02	6,8	4	8	2	-	-	-
136	1648	2/10	08°26'S	140°36'W	81.0	080	14	81.2	75.5	1010	03	8	4	8	2	-	-	-
137	2207	2/10	08°24'S	140°38'W	81.4	080	14	82.5	75.3	1008	01	8	2	8	2	-	-	35.81
138	0205	2/11	08°30'S	140°31'W	81.4	080	13	80.4	74.3	1007	02	8	3	8	2	-	-	-
139	0608	2/11	08°55'S	140°46'W	81.4	120	02	81.2	75.1	1010	03	8,5	4	8	2	-	-	35.79
140	1159	2/11	09°30'S	141°22'W	81.4	100	08	80.6	74.7	1008	01	8	1	8	2	-	-	-

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
141	1800	2/11	10°05'S	141°59'W	81.9	100	14	81.5	75.1	1011	15	8,7	6	8	2	-	-	35.90
142	0000	2/12	10°38'S	142°35'W	83.2	030	07	83.0	75.3	1008	01	8	2	8	1	-	-	-
143	0556	2/12	11°12'S	143°14'W	82.7	175	05	79.5	72.5	1010	03	4,8	4	8	1	-	-	35.95
144	1200	2/12	11°44'S	143°52'W	82.3	090	13	81.5	73.5	1008	01	8	2	8	2	-	-	-
145	1757	2/12	12°19'S	144°28'W	83.0	070	11	83.0	74.3	1010	02	8	2	8	2	-	-	35.88
146	0000	2/13	12°57'S	145°03'W	84.1	040	10	84.0	76.0	1008	02	8	2	8	2	-	-	-
147	0558	2/13	13°38'S	145°38'W	83.5	020	06	83.1	74.6	1010	03	8	6	8	1	-	-	36.08
148	1159	2/13	14°13'S	146°16'W	83.0	160	06	81.3	74.6	1010	01	8,6	2	8	1	-	-	-
149	1757	2/13	14°56'S	146°48'W	83.4	090	07	83.6	75.2	1011	02	8	1	8	1	-	-	36.35
150	0002	2/14	15°32'S	147°21'W	87.4	180	04	83.2	75.5	1009	03	8	6	8	0	-	-	-
151	0556	2/14	16°03'S	148°04'W	85.0	180	04	82.0	75.0	1010	01	4,8	3	8	0	-	-	36.24
152	1200	2/14	16°44'S	148°38'W	83.1	080	12	81.4	76.1	1008	03	6,8	7	8	2	-	-	-
153	1703	2/19	16°34'S	150°04'W	83.5	100	09	83.5	77.5	1012	03	6,8	5	8	2	-	-	-
154	2211	2/19	16°34'S	150°06'W	83.9	070	08	84.0	77.0	1011	02	6,8	5	8	2	-	-	36.22
155	0152	2/20	16°39'S	149°57'W	84.3	060	05	83.1	77.2	1009	15	6,8,9	6	8	2	-	-	-
156	0902	2/20	15°48'S	149°48'W	83.5	040	10	83.2	78.0	1012	15	8	2	8	2	-	-	36.27
157	1653	2/20	15°04'S	149°51'W	83.5	040	10	84.3	77.6	1011	01	5,8	3	8	2	-	-	-
158	2207	2/20	15°05'S	149°52'W	84.7	040	08	84.0	76.4	1011	14	8,4	5	8	2	-	-	36.02
159	0141	2/21	15°04'S	149°42'W	84.2	040	05	83.6	77.9	1009	14	8,6	6	8	2	-	-	-
160	0900	2/21	14°11'S	149°32'W	83.5	050	04	81.0	76.5	1011	01	8	2	8	2	-	-	36.06
161	1658	2/21	13°22'S	149°37'W	83.3	140	05	80.7	77.9	1012	15	8,9	7	8	2	-	-	-
162	2159	2/21	13°24'S	149°37'W	83.7	040	07	81.0	76.5	1012	01	8,6	5	8	2	-	-	36.13
163	0135	2/22	13°26'S	149°28'W	84.5	040	10	85.5	76.0	1010	02	6,8	3	8	2	-	-	-
164	0916	2/22	12°31'S	149°15'W	82.9	070	16	82.8	76.0	1012	01	8	1	8	2	-	-	36.08
165	1655	2/22	12°02'S	149°20'W	83.1	070	14	83.2	77.6	1012	02	4,8	6	8	2	-	-	-
166	2201	2/22	12°06'S	149°18'W	83.4	070	16	83.4	77.0	1012	03	8	5	8	3	-	-	36.06
167	0142	2/23	12°08'S	149°12'W	83.4	090	15	86.0	78.0	1010	01	8	2	8	3	-	-	-
168	0900	2/23	11°24'S	149°00'W	82.7	100	18	80.5	77.8	1012	02	8	2	8	3	-	-	35.90
169	1656	2/23	10°31'S	148°57'W	82.8	100	14	83.8	77.8	1012	03	8	2	8	3	-	-	-
170	2208	2/23	10°36'S	148°57'W	83.0	090	07	83.3	77.0	1012	14	8,9	4	8	3	-	-	35.93
171	0203	2/24	10°46'S	148°50'W	83.3	090	16	84.5	77.5	1010	03	8,5	3	8	3	-	-	-
172	0858	2/24	09°52'S	148°40'W	82.6	090	17	81.2	75.0	1012	01	8	2	8	3	-	-	35.93
173	1655	2/24	09°08'S	148°42'W	81.7	090	12	82.6	77.0	1014	03	8	5	8	2	-	-	-
174	2204	2/24	09°06'S	148°40'W	82.2	090	12	83.0	76.0	1013	02	8	2	8	3	-	-	35.79
175	0135	2/25	09°07'S	148°32'W	82.8	090	14	82.8	77.0	1011	03	8	3	8	3	-	-	-

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
176	0858	2/25	08°12'S	148°23'W	81.9	110	18	81.4	76.5	1012	01	8	2	8	3	-	-	35.82
177	1655	2/25	07°18'S	148°29'W	81.0	060	11	80.5	75.5	1012	03	4,8	4	8	2	-	-	-
178	2200	2/25	07°18'S	148°29'W	81.2	080	12	83.2	75.7	1012	02	8,4	3	8	3	-	-	35.71
179	0154	2/26	07°24'S	148°22'W	81.9	070	09	83.5	75.5	1010	01	8	1	8	2	-	-	-
180	0801	2/26	06°41'S	148°16'W	80.9	070	11	81.0	75.3	1012	02	8	1	8	2	-	-	35.64
181	1658	2/26	05°53'S	148°20'W	80.4	100	08	80.3	75.9	1012	03	8,4	3	8	2	-	-	-
182	2205	2/26	05°52'S	148°22'W	81.5	060	09	82.0	74.3	1012	02	6,8	5	8	2	-	-	35.62
183	0143	2/27	05°59'S	148°13'W	81.3	070	08	81.2	74.5	1010	01	8	3	8	2	-	-	-
184	0902	2/27	05°10'S	148°04'W	80.1	080	08	78.9	74.0	1013	02	8	1	8	2	-	-	35.59
185	1654	2/27	04°16'S	148°02'W	79.8	090	10	80.0	74.0	1012	02	8	2	8	2	-	-	-
186	2215	2/27	04°18'S	148°02'W	80.2	090	09	79.3	74.2	1011	02	8	2	8	2	-	-	35.48
187	0127	2/28	04°26'S	147°57'W	80.9	080	11	80.5	74.0	1009	02	8	2	8	2	-	-	-
188	0811	2/28	03°34'S	148°01'W	79.6	080	10	79.0	74.0	1012	02	8	2	8	2	-	-	35.41
189	1657	2/28	02°49'S	148°14'W	79.6	100	08	79.5	74.3	1012	03	8	5	8	2	-	-	-
190	2203	2/28	02°52'S	148°16'W	80.2	120	14	80.0	75.5	1011	02	8,5	3	8	2	-	-	35.43
191	0141	3/1	03°01'S	148°09'W	80.5	090	09	80.1	75.3	1009	01	8	3	8	2	-	-	-
192	0754	3/1	02°14'S	148°00'W	79.6	120	10	80.0	75.3	1012	02	8	3	8	2	-	-	35.41
193	1656	3/1	01°27'S	147°54'W	79.5	080	10	79.5	75.0	1012	02	4,8	2	8	2	-	-	-
194	2202	3/1	01°26'S	147°54'W	79.9	080	07	80.4	74.9	1011	02	4,8	2	8	2	-	-	35.39
195	0130	3/2	01°31'S	147°45'W	80.4	070	08	80.1	74.7	1009	03	8	4	8	2	-	-	-
196	0756	3/2	00°45'S	147°46'W	79.3	080	09	78.8	74.5	1013	02	8	2	8	2	-	-	35.14
197	1655	3/2	00°08'N	147°58'W	79.0	090	07	79.6	75.1	1013	02	8	4	8	1	-	-	-
198	2206	3/2	00°06'N	147°58'W	79.9	080	08	79.8	74.6	1012	01	8	2	8	2	-	-	35.03
199	0145	3/3	00°02'N	147°50'W	79.7	070	09	80.0	74.3	1009	02	8	2	8	2	-	-	-
200	0555	3/3	00°32'N	147°52'W	79.2	070	10	79.0	75.5	1010	02	8	2	8	2	-	-	35.05
201	1657	3/3	01°10'N	148°04'W	79.7	080	09	79.5	75.0	1012	02	8	2	8	2	-	-	-
202	2204	3/3	01°08'N	148°06'W	80.2	100	12	80.0	75.2	1011	03	8	4	8	2	-	-	35.05
203	0127	3/4	01°01'N	147°56'W	80.2	100	09	79.5	74.6	1008	02	8	3	8	2	-	-	-
204	0529	3/4	01°32'N	147°56'W	80.0	100	10	79.0	75.0	1010	02	8	3	8	2	-	-	35.05
205	1657	3/4	02°03'N	148°04'W	79.9	080	10	80.0	76.0	1011	02	8	5	8	2	-	-	-
206	2212	3/4	02°00'N	148°06'W	80.3	070	15	80.0	74.8	1010	02	8	4	8	2	-	-	35.08
207	0135	3/5	01°52'N	147°58'W	80.5	090	12	80.1	75.1	1008	02	8	2	8	2	-	-	-
208	0554	3/5	02°24'N	147°58'W	80.3	080	14	79.8	75.3	1009	01	8	2	8	2	-	-	35.05
209	1656	3/5	03°02'N	148°05'W	79.9	060	16	80.0	76.0	1009	03	8	6	8	2	-	-	-
210	2158	3/5	03°01'N	148°07'W	80.2	080	18	81.0	75.5	1008	02	8	6	8	3	-	-	35.05

Table 4.--Observations at bathythermograph lowerings, John R. Manning cruise 34 (coded according to H.O. Pub. 606-c, first edition, 1951) (cont'd)

Ser. No.	Time, GMT	Date, 1957	Latitude	Longitude	Bkt. temp., °F.	Wind		Air temp.		Barometer, mb.	Weather	Clouds		Visibility	Sea	Swell		Surf. sal., ‰
						Dir., °T.	Force, kt.	Dry bulb, °F.	Wet bulb, °F.			Type	Cover			Dir. °T.	Amt.	
211	0115	3/6	02°55'N	148°01'W	80.4	060	14	80.0	76.0	1007	50	8	6	8	3	-	-	-
212	0556	3/6	03°30'N	148°26'W	80.1	080	16	80.5	76.0	1010	01	8	1	8	2	-	-	35.08
213	1004	3/6	04°00'N	148°40'W	80.0	070	14	80.2	76.0	1011	02	8	1	8	2	-	-	35.10
214	1400	3/6	04°28'N	148°52'W	80.0	080	16	80.1	75.9	1009	02	8	1	8	2	-	-	35.07
215	1755	3/6	04°53'N	149°04'W	80.4	080	20	81.3	76.0	1012	03	8	5	8	3	-	-	35.05
216	2152	3/6	05°17'N	149°17'W	81.2	060	18	81.4	76.0	1010	02	8,4	5	8	3	-	-	34.92
217	0153	3/7	05°40'N	149°30'W	81.3	050	18	82.0	76.2	1008	02	8	5	8	3	-	-	34.79
218	0546	3/7	06°04'N	149°42'W	81.2	070	20	81.8	76.8	1010	01	8	2	8	3	-	-	34.81
219	1158	3/7	06°38'N	149°58'W	80.8	070	20	80.2	76.0	1010	03	8	3	8	3	-	-	-
220	1752	3/7	07°14'N	150°16'W	80.9	100	15	77.0	75.0	1012	21	7	8	7	3	-	-	34.74
221	2351	3/7	07°52'N	150°38'W	80.5	060	20	79.5	75.0	1010	01	7	6	8	4	-	-	-
222	0550	3/8	08°27'N	151°00'W	79.8	060	22	79.0	75.3	1011	01	8	4	8	4	-	-	34.81
223	1159	3/8	09°08'N	151°24'W	79.3	070	21	78.1	74.6	1011	01	8	3	8	3	-	-	-
224	1752	3/8	09°49'N	151°48'W	79.6	080	20	79.0	74.3	1013	03	8	6	8	3	-	-	34.60
225	2349	3/8	10°28'N	152°12'W	79.3	050	20	78.4	73.8	1011	02	8,4	6	8	3	-	-	-
226	0550	3/9	11°06'N	152°36'W	79.0	080	18	79.0	74.1	1012	02	8	6	8	3	-	-	34.43
227	1158	3/9	11°46'N	152°59'W	78.0	070	21	77.0	74.1	1012	01	8	4	8	3	-	-	-
228	1750	3/9	12°25'N	153°22'W	77.3	080	19	77.0	72.2	1014	03	8,4	7	8	3	-	-	34.36
229	2352	3/9	13°07'N	153°45'W	77.0	060	24	76.1	72.4	1012	02	4,8	6	8	4	-	-	-
230	0553	3/10	13°38'N	154°01'W	76.1	060	27	75.2	71.0	1014	02	8	6	8	4	-	-	34.47
231	1202	3/10	14°15'N	154°22'W	74.8	080	21	73.5	69.2	1014	02	8	6	8	4	-	-	-
232	1750	3/10	14°53'N	154°44'W	74.9	050	18	75.2	70.9	1016	02	8,4	6	8	4	-	-	34.42
233	2352	3/10	15°32'N	155°08'W	75.2	060	20	76.0	70.0	1015	02	5,8	8	8	4	-	-	-
234	0553	3/11	16°09'N	155°32'W	74.5	060	20	73.5	68.5	1016	02	4,8	7	8	3	-	-	34.78
235	1157	3/11	16°54'N	155°50'W	74.0	060	19	73.2	67.0	1015	03	4,8	8	7	3	-	-	-
236	1754	3/11	17°38'N	156°08'W	73.4	070	16	72.8	67.0	1017	02	5,8	8	8	3	-	-	35.01
237	2355	3/11	18°24'N	156°28'W	73.6	080	16	73.6	68.0	1017	01	4,8	3	8	3	-	-	-
238	0554	3/12	19°09'N	156°49'W	73.8	130	13	73.4	67.7	1017	02	6,8	3	8	2	-	-	34.90
239	1200	3/12	19°56'N	157°11'W	74.0	230	09	70.4	67.8	1017	50	7	8	7	2	-	-	-
240	1752	3/12	20°43'N	157°35'W	74.4	060	14	73.6	67.0	1018	01	6,8	5	8	2	-	-	34.90

Table 5.--Surface salinity, inorganic phosphate, and temperature observations, Charles H. Gilbert cruise 32

Date, 1957	Time, GMT	Position		Salinity, ‰	PO_4-P, µg at./L.	Temperature, °F.
		Latitude	Longitude			
1/12	0800	21°25'N	158°16'W	34.90	0.28	75.7
1/12	0955	21°25'N	158°26'W	34.88	0.25	76.0
1/12	1145	21°25'N	158°36'W	34.90	0.14	75.8
1/12	1300	21°25'N	158°46'W	34.90	0.25	75.9
1/12	1410	21°25'N	158°56'W	34.88	0.17	76.1
1/12	1510	21°34'N	158°55'W	34.88	0.17	75.9
1/12	1615	21°35'N	158°46'W	34.90	0.19	75.4
1/12	1800	21°25'N	158°36'W	34.88	0.26	75.7
1/12	1920	21°36'N	158°26'W	34.92	0.51	75.3
1/12	2030	21°40'N	158°16'W	34.94	0.17	75.2
1/12	2137	21°43'N	158°07'W	34.94	0.13	75.0
1/12	2300	21°47'N	157°56'W	34.97	0.21	74.7
1/13	0045	21°57'N	157°56'W	34.96	0.67	74.8
1/13	0155	22°07'N	157°56'W	34.96	0.14	75.6
1/13	0310	22°17'N	157°56'W	34.96	0.15	74.4
1/13	0440	22°16'N	157°47'W	34.97	0.15	74.0
1/13	0630	22°06'N	157°47'W	34.97	0.18	74.0
1/13	0800	21°58'N	157°46'W	34.94	0.17	74.4
1/13	0910	21°46'N	157°44'W	34.94	0.21	74.3
1/13	1035	21°37'N	157°46'W	34.94	0.16	74.3
1/13	1730	20°53'N	157°13'W	34.90	0.14	74.3
1/14	2330	17°08'N	155°02'W	34.54	0.25	75.9
1/15	2330	14°19'N	153°01'W	34.74	0.34	75.3
1/16	2330	11°20'N	151°26'W	34.29	0.21	76.9
1/17	2330	08°30'N	149°52'W	34.33	0.14	80.0
1/18	2330	05°48'N	147°50'W	34.92	0.38	78.7
1/19	0530	05°08'N	147°22'W	34.78	0.21	80.0
1/19	1130	04°25'N	146°52'W	34.88	0.32	79.7
1/19	1740	03°42'N	146°22'W	34.97	0.49	78.3
1/19	2330	03°04'N	145°58'W	34.97	0.48	78.5
1/20	0530	02°23'N	145°34'W	34.96	0.50	78.3
1/20	1130	01°42'N	145°15'W	34.97	0.36	76.7
1/20	1730	01°00'N	144°54'W	34.94	0.53	76.3
1/20	2330	00°18'N	144°30'W	34.99	0.53	76.7
1/21	0530	00°25'S	144°00'W	35.19	0.61	76.4
1/21	1130	01°12'S	143°36'W	35.26	0.63	77.0
1/21	1730	02°00'S	143°14'W	35.35	0.55	77.8
1/21	2330	02°49'S	142°51'W	35.37	0.64	78.1
1/22	0530	03°36'S	142°30'W	35.41	0.56	78.3
1/22	1130	04°23'S	142°10'W	35.34	0.60	78.2
1/22	1730	05°10'S	141°49'W	35.39	0.60	78.4
1/22	2330	05°59'S	141°28'W	35.34	0.56	78.3
1/23	0530	06°50'S	141°08'W	35.41	0.60	79.0
1/23	1130	07°40'S	140°50'W	35.64	0.60	79.2
1/23	1730	08°27'S	140°31'W	35.75	0.43	80.9
1/24	1530	08°56'S	140°05'W	35.73	-	80.7
1/25	1730	09°12'S	140°07'W	35.73	-	80.7
1/25	2330	09°28'S	140°00'W	35.73	-	81.2
1/26	2025	09°34'S	139°55'W	35.75	-	81.2
1/27	1550	09°48'S	139°02'W	35.28	-	81.6

Table 5.--Surface salinity, inorganic phosphate, and temperature observations, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Time, GMT	Position		Salinity, ‰	PO_4-P, µg at./L.	Temperature, °F.
		Latitude	Longitude			
1/27	1820	09°58'S	139°01'W	-	0.44	81.0
1/27	2330	10°24'S	138°45'W	-	0.44	81.3
1/28	1607	09°36'S	138°47'W	-	0.47	-
1/28	1735	09°28'S	138°53'W	-	0.47	80.8
1/28	2042	09°17'S	139°06'W	-	0.33	-
1/28	2200	09°10'S	139°15'W	-	0.42	-
1/28	2330	09°01'S	139°36'W	-	0.40	82.3
1/29	0115	Hananai Bay		34.79	-	85.5
1/29	0310	08°56'S	139°35'W	27.00	-	85.5
1/29	1537	08°56'S	139°28'W	-	0.40	-
1/29	1730	08°50'S	139°16'W	-	0.56	80.7
1/29	1930	08°46'S	139°15'W	-	0.45	-
1/29	2135	08°29'S	139°24'W	-	0.46	-
1/29	2330	08°16'S	139°30'W	-	0.44	81.6
1/30	0217	07°58'S	139°46'W	-	0.40	-
1/30	1540	07°52'S	140°01'W	-	0.40	80.6
1/30	1730	07°47'S	140°16'W	-	0.60	80.2
1/30	1930	07°48'S	140°26'W	-	0.52	-
1/30	2135	07°58'S	140°42'W	-	0.42	-
1/30	2330	08°10'S	140°38'W	-	0.44	81.0
1/31	0135	08°24'S	140°26'W	-	0.37	-
1/31	0340	08°36'S	140°15'W	-	0.49	-
1/31	1600	08°50'S	140°02'W	35.84	-	-
2/1	1640	08°56'S	140°15'W	35.70	-	81.5
2/4	2340	08°54'S	140°02'W	24.13	-	82.0
2/5	1535	08°54'S	140°05'W	35.70	-	81.0
2/6	0200	08°50'S	140°04'W	35.75	-	81.7
2/7	2050	08°56'S	140°05'W	35.59	-	84.5
2/8	2220	08°50'S	140°04'W	35.62	-	81.9
2/25	1610	09°54'S	139°05'W	35.73	-	81.5
2/27	1925	09°54'S	139°05'W	35.62	-	82.5
2/27	-	09°54'S	139°04'W	35.84	-	-
2/27	2220	09°48'S	139°02'W	33.73	-	82.5
3/11	1627	08°56'S	140°05'W	35.88	-	82.2
3/12	2335	08°41'S	140°22'W	35.82	0.44	83.3
3/13	0530	07°56'S	140°46'W	35.48	0.54	81.5
3/13	1130	07°09'S	141°11'W	35.50	0.65	81.5
3/13	1730	06°46'S	141°23'W	35.34	0.60	81.2
3/13	2330	05°36'S	141°59'W	35.25	0.56	82.2
3/14	0530	04°51'S	142°24'W	35.21	0.56	80.8
3/14	1130	04°04'S	142°51'W	35.28	0.58	80.9
3/14	1730	03°18'S	143°16'W	35.19	0.57	81.1
3/14	2332	02°35'S	143°40'W	35.17	0.53	81.7
3/15	0530	01°52'S	144°06'W	35.12	0.59	80.5
3/15	1130	-	144°31'W	35.14	0.63	79.1
3/15	1745	00°25'S	145°08'W	35.10	0.60	79.5
3/15	2330	00°20'N	145°20'W	34.97	0.61	83.5
3/16	0530	01°08'N	145°46'W	35.03	0.49	81.6
3/16	1130	01°57'N	146°12'W	35.03	0.53	81.1
3/16	1730	02°46'N	146°38'W	34.94	0.91	80.0

Table 5.--Surface salinity, inorganic phosphate, and temperature observations, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Time, GMT	Position		Salinity, ‰	PO_4-P, µg at./L.	Temperature, °F.
		Latitude	Longitude			
3/16	2335	03°36'N	147°03'W	34.97	0.54	84.7
3/17	0530	04°22'N	147°24'W	34.88	0.51	80.0
3/17	1130	05°09'N	147°44'W	34.94	0.46	80.1
3/17	2330	06°40'N	148°28'W	34.87	0.36	83.7
3/18	2330	09°17'N	150°19'W	34.33	0.29	79.1
3/19	2328	12°06'N	152°01'W	34.25	0.23	78.1
3/20	2330	15°03'N	153°38'W	34.31	0.28	76.8
3/21	2330	18°01'N	155°46'W	34.67	0.21	75.2
3/22	2330	20°52'N	157°44'W	34.90	0.22	74.0
3/23	0600	21°27'N	158°12'W	34.88	-	75.5

Table 6.--Weather observations (USWB 1210-F), Hugh M. Smith cruise 38[1/]

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/13	18.9°N	155.8°W	0000	99	12	10	58	1	1015.2	7	2.0	77.6	65.5	76.0	5	5	8	X	0	0	12	2	4
1/13	18.5°N	155.3°W	0600	99	10	24	01	2	1018.0	2	2.5	72.8	64.9	74.5	7	7	8	X	X	X	10	2	4
1/13	18.2°N	154.5°W	1200	99	05	14	02	2	1015.6	7	2.5	72.9	62.1	74.1	8	8	8	X	X	X	XX	X	3
1/13	17.7°N	153.6°W	1800	99	06	17	15	2	1015.6	2	0.7	71.0	64.0	75.2	8	4	9	X	X	X	06	3	4
1/14	17.3°N	153.1°W	0000	99	05	17	02	2	1011.9	6	3.7	71.0	64.9	75.3	6	6	2	X	0	0	05	2	3
1/14	16.8°N	152.2°W	0600	99	05	16	02	2	1012.9	2	1.0	71.5	64.5	74.8	7	6	6	X	X	X	05	2	3
1/14	16.4°N	151.4°W	1200	99	07	14	02	2	1011.5	7	2.7	71.1	66.9	73.7	8	4	8	X	3	X	06	3	4
1/14	15.9°N	150.7°W	1800	99	12	13	02	2	1011.9	2	1.7	73.8	65.0	73.7	8	8	8	X	3	X	08	3	2
1/15	15.4°N	149.9°W	0000	99	07	14	02	2	1008.8	7	3.4	75.0	69.1	75.5	8	8	8	X	X	X	06	2	3
1/15	14.9°N	149.1°W	0600	99	11	16	02	2	1011.5	2	1.5	75.5	69.3	75.5	8	3	8	X	7	X	07	3	4
1/15	14.4°N	148.4°W	1200	99	08	13	02	2	1011.2	6	1.7	75.5	71.0	75.8	8	8	8	X	X	X	08	2	3
1/15	14.0°N	147.4°W	1800	99	06	17	02	2	1008.8	2	1.0	75.7	71.4	76.5	7	7	8	X	0	0	06	2	3
1/16	13.5°N	146.7°W	0000	99	09	19	15	2	1009.5	7	1.4	78.0	73.4	77.4	7	3	8	X	4	0	06	4	3
1/16	13.0°N	145.7°W	0600	99	08	22	01	2	1011.2	2	6.3	76.2	73.0	76.0	7	X	8	X	4	X	06	X	3
1/16	12.5°N	144.9°W	1200	99	07	19	02	2	1010.5	7	0.7	75.5	72.6	78.4	7	X	X	7	3	X	06	2	4
1/16	12.0°N	144.0°W	1800	99	08	22	01	0	1011.9	1	1.0	76.8	73.9	75.4	1	1	1	4	0	0	07	2	3
1/17	11.6°N	143.6°W	0000	99	07	16	03	1	1009.5	8	1.7	78.0	73.9	76.6	4	3	1	X	4	0	06	3	4
1/17	11.2°N	142.8°W	0600	99	07	22	03	1	1011.9	1	2.2	77.8	74.5	77.0	6	6	8	X	X	X	07	2	3
1/17	10.7°N	142.1°W	1200	99	05	28	51	2	1011.2	8	0.7	76.5	73.3	76.9	8	8	8	X	X	X	06	2	5
1/17	10.4°N	141.4°W	1800	99	06	26	03	1	1012.2	3	0.3	77.3	73.7	76.9	2	2	8	4	0	0	06	2	5
1/18	10.0°N	140.7°W	0000	98	06	25	03	1	1010.2	7	1.7	79.3	73.4	76.0	5	3	9	X	4	9	06	3	5
1/18	09.6°N	139.9°W	0600	99	06	24	02	2	1011.2	1	2.0	77.1	73.0	77.0	5	1	2	X	4	9	06	2	4
1/18	09.1°N	139.1°W	1200	99	04	28	02	1	1010.5	7	0.7	76.2	71.9	76.8	2	2	1	X	X	X	05	2	4
1/18	08.6°N	138.4°W	1800	99	05	25	02	2	1011.5	1	0.3	79.0	74.0	79.0	8	8	8	5	X	X	05	2	4
1/19	08.3°N	137.7°W	0000	99	06	20	15	2	1007.5	7	2.7	79.4	73.7	79.3	7	7	7	X	0	0	05	4	4
1/19	07.8°N	137.1°W	0600	99	05	26	02	2	1009.5	1	2.2	78.2	74.8	79.3	5	2	1	X	4	X	07	X	4
1/19	07.3°N	136.3°W	1200	99	02	24	02	2	1007.5	7	1.0	79.4	75.5	79.0	7	7	4	X	X	X	06	2	4
1/19	06.8°N	135.5°W	1800	99	05	06	21	2	1010.5	1	0.4	77.0	74.9	78.7	8	8	4	5	X	X	06	2	4
1/20	06.4°N	134.3°W	0000	99	11	06	15	2	1008.1	6	1.4	78.9	75.0	79.6	8	8	3	X	X	X	XX	X	3
1/20	05.8°N	133.5°W	0600	99	15	08	02	2	1011.5	1	2.0	80.0	75.0	79.0	8	8	X	X	X	X	XX	X	3
1/20	05.4°N	132.7°W	1200	99	13	15	02	2	1009.8	7	0.7	79.4	74.6	78.8	8	8	4	X	X	X	XX	X	3
1/20	04.8°N	132.0°W	1800	99	14	18	02	1	1012.2	1	0.1	80.0	75.0	79.1	4	4	4	4	3	0	12	2	3
1/21	04.2°N	131.3°W	0000	99	15	18	01	1	1008.1	7	2.0	79.0	73.7	76.9	4	1	1	X	4	5	15	3	4
1/21	03.8°N	130.6°W	0600	99	13	17	01	0	1011.2	1	1.7	78.2	74.0	76.8	1	1	1	X	X	X	15	X	3
1/21	03.2°N	129.9°W	1200	99	13	12	02	0	1010.5	7	0.7	77.6	71.4	77.6	1	1	1	X	X	X	15	X	2
1/21	02.7°N	129.0°W	1800	99	14	12	03	1	1013.9	1	0.8	80.0	73.6	77.9	4	4	2	X	0	0	11	2	2
1/22	02.4°N	128.4°W	0000	99	14	10	01	0	1009.8	7	2.7	79.8	72.6	79.0	1	1	1	X	7	0	14	3	2
1/22	01.8°N	127.6°W	0600	99	13	12	02	0	1011.5	1	2.0	78.0	73.0	77.5	1	1	0	X	2	X	13	2	2
1/22	01.3°N	126.9°W	1200	99	09	10	02	0	1010.2	7	1.0	76.2	70.5	78.5	1	1	X	X	4	X	XX	X	X
1/22	00.5°N	126.0°W	1800	99	09	08	02	0	1013.2	1	1.0	79.0	73.7	76.5	2	2	3	4	0	0	10	3	2

[1/] All columns in USWB 1210-F are not included here. Those deleted are:

Column	2	Day of week	Column	23	Course of ship
"	3	Octant	"	24	Speed of ship
"	13	Barometer as read	"	31	Diff. sea-air, °F.
"	14	Barometer as corrected	"	32	Dew point, °F.
"	17	Air temperature, °F.			

Table 6.--Weather observations (USWB 1210-F), Hugh M. Smith cruise 38 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/23	00.3°N	125.5°W	0000	99	09	09	02	0	1009.5	7	2.0	77.0	72.3	75.2	1	1	1	5	0	0	10	4	3
1/23	00.0°	124.8°W	0600	99	15	12	02	0	1011.9	1	1.4	78.3	75.8	76.8	1	1	1	X	X	X	XX	X	X
1/23	00.0°	123.9°W	1200	99	13	13	02	0	1010.5	6	0.7	76.8	71.9	75.2	1	1	1	X	X	X	XX	X	X
1/23	00.0°	122.5°W	2200	99	15	12	02	0	1010.5	7	1.4	80.6	75.0	76.4	1	1	1	X	0	0	13	2	2
1/24	00.0°	121.5°W	0600	99	13	15	02	0	1012.9	2	1.0	77.5	73.7	76.3	1	1	1	X	X	X	13	2	2
1/24	00.0°	120.6°W	1200	99	14	15	02	0	1011.2	7	0.7	75.5	72.3	75.9	3	3	1	X	0	0	14	3	3
1/24	00.0°	120.0°W	1800	99	14	16	02	0	1012.9	7	0.7	79.3	74.1	76.0	1	1	1	X	0	0	14	3	3
1/25	00.3°N	119.3°W	0000	99	14	15	02	0	1009.5	6	0.3	78.2	73.1	76.0	4	4	1	X	0	0	14	3	3
1/25	00.0°	118.5°W	0600	99	15	15	02	0	1012.9	2	1.9	76.4	72.6	75.5	2	2	8	X	0	0	15	3	3
1/25	00.0	117.6°W	1200	99	15	14	02	0	1011.2	5	0.7	76.6	72.9	75.0	1	1	X	X	X	X	XX	X	2
1/25	00.0°	117.0°W	1800	99	14	14	01	1	1013.9	1	0.7	78.4	73.5	75.6	3	2	1	X	0	1	10	2	2
1/26	00.0°	116.2°W	0000	99	14	14	03	1	1010.2	7	1.4	77.3	71.9	75.8	7	7	5	X	0	5	14	3	3
1/26	00.2°S	115.0°W	0600	99	15	12	02	X	1012.9	0	0.3	77.8	74.6	75.2	X	X	X	X	X	X	XX	X	2
1/26	00.0°	113.5°W	1800	99	14	14	01	0	1012.5	0	0.3	78.5	73.5	75.4	1	1	1	X	0	1	14	3	3
1/27	00.0°	112.6°W	0000	99	15	16	02	0	1009.1	5	0.7	80.5	77.0	75.5	1	1	2	X	0	0	13	2	3
1/27	00.0°	111.9°W	0600	99	14	14	02	0	1011.5	2	1.0	77.2	74.6	76.1	X	X	X	X	X	X	14	2	3
1/27	00.0°	111.2°W	1200	99	15	13	03	1	1009.8	5	0.7	76.5	71.4	76.5	5	5	X	X	X	X	14	2	3
1/27	00.0°	110.4°W	1800	99	14	14	01	1	1012.5	0	0.6	78.2	74.0	76.3	1	1	1	X	1	0	12	2	2
1/28	00.6°S	110.1°W	0000	99	15	10	03	1	1009.1	6	0.7	76.6	73.0	75.5	7	7	4	X	0	0	15	2	2
1/28	01.5°S	110.1°W	0600	99	18	10	02	1	1011.5	1	1.0	76.3	72.9	75.0	8	7	4	X	X	X	16	3	3
1/28	03.4°S	110.0°W	1800	99	15	16	03	2	1012.5	0	0.3	76.8	72.5	75.9	8	8	4	X	X	X	16	3	3
1/29	04.0°S	110.0°W	0000	99	13	12	02	1	1010.2	6	1.4	76.6	72.1	76.2	6	4	1	X	4	4	14	3	3
1/29	05.0°S	109.9°W	0600	99	15	15	02	1	1012.2	1	1.0	75.7	72.4	75.7	3	3	1	X	X	X	15	3	3
1/29	05.8°S	109.9°W	1200	99	12	14	02	0	1010.8	5	0.2	75.1	71.1	76.0	3	3	X	X	X	X	14	3	2
1/29	06.5°S	110.0°W	1800	99	12	14	01	0	1012.5	0	1.0	77.9	72.1	76.7	1	1	1	5	0	0	12	4	3
1/30	07.3°S	110.0°W	0000	99	14	15	03	1	1009.8	6	0.7	77.5	73.5	77.2	4	4	2	5	0	0	16	2	2
1/30	08.2°S	110.0°W	0600	99	10	11	02	0	1012.2	1	0.5	76.1	70.7	76.5	X	X	X	X	X	X	XX	X	X
1/30	09.0°S	110.0°W	1200	99	14	10	02	0	1011.2	5	0.3	75.1	70.4	76.6	2	2	X	X	X	X	14	3	3
1/30	11.0°S	110.0°W	1900	99	10	10	02	0	1012.9	0	0.3	77.6	72.1	76.8	1	1	1	X	0	0	14	3	3
1/31	11.5°S	110.0°W	0600	99	12	06	02	0	1012.2	1	1.0	76.1	69.0	77.2	3	3	1	X	X	X	12	3	3
1/31	13.2°S	110.0°W	1800	99	13	04	02	0	1012.5	4	0.0	78.5	70.9	79.6	1	1	8	X	0	0	12	3	0
2/1	13.7°S	110.0°W	0000	99	14	04	03	0	1010.8	6	1.0	80.1	72.7	79.6	4	3	8	5	4	0	16	3	3
2/1	13.7°S	110.2°W	1300	98	09	08	60	X	1011.2	1	0.9	75.0	73.5	79.0	8	8	7	5	X	X	12	3	3
2/2	13.5°S	110.2°W	0000	99	04	06	20	6	1009.1	7	0.7	77.6	73.0	79.4	8	8	4	X	X	X	12	3	2
2/3	13.6°S	110.5°W	0300	99	08	08	00	X	1010.5	2	0.9	79.1	75.1	79.5	X	X	X	X	X	X	XX	X	X
2/4	13.6°S	110.7°W	0200	99	10	10	02	0	1011.5	X	XX	79.9	75.9	79.9	3	3	1	X	0	0	13	4	3
2/4	13.6°S	111.1°W	2000	99	09	10	02	X	1011.9	7	XX	79.7	73.8	79.9	2	2	8	X	0	0	11	2	3
2/5	13.6°S	111.2°W	0200	99	09	11	03	0	1011.2	2	0.7	79.4	76.2	79.7	4	4	8	X	0	0	11	2	3
2/5	13.8°S	111.4°W	2000	99	09	10	02	1	1010.8	X	XX	80.4	75.0	79.9	2	2	8	X	0	0	08	2	3
2/6	13.8°S	111.5°W	0300	99	13	10	02	1	1010.8	2	0.9	79.5	76.9	79.9	4	4	8	X	X	X	11	2	3
2/6	13.7°S	111.7°W	2000	99	07	12	02	1	1009.8	X	XX	80.0	73.8	80.1	2	2	8	X	0	0	08	2	3
2/7	13.7°S	111.9°W	0200	99	09	12	02	0	1010.2	2	0.5	79.9	77.0	80.1	3	3	8	X	0	0	08	2	3
2/7	14.0°S	112.0°W	2000	99	09	18	03	2	1010.8	X	XX	77.9	73.3	79.4	7	7	8	X	0	0	09	2	3
2/8	14.0°S	112.3°W	0200	99	09	13	01	1	1010.5	2	0.7	79.3	76.0	79.6	3	3	8	X	0	0	09	2	3
2/8	14.1°S	112.5°W	2000	99	09	13	01	1	1011.9	7	0.7	79.7	74.2	80.2	3	3	8	X	0	0	09	2	3
2/9	14.1°S	112.7°W	0200	99	09	13	02	0	1010.8	3	0.5	79.4	74.9	80.1	3	3	8	X	0	0	09	2	3

Table 6.--Weather observations (USWB 1210-F), Hugh M. Smith cruise 38 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
2/9	14.4°S	112.6°W	2100	99	09	13	02	0	1010.5	X	XX	79.8	73.2	80.1	2	2	8	X	0	0	09	2	3
2/10	14.5°S	112.6°W	0200	99	08	14	02	0	1010.2	2	0.7	79.7	75.6	80.2	3	3	8	X	0	0	09	2	3
2/10	14.2°S	112.6°W	2000	99	09	16	02	0	1009.8	X	XX	80.0	73.5	80.1	3	3	8	4	0	0	09	2	3
2/11	14.3°S	112.7°W	0200	99	06	13	02	0	1009.5	2	0.2	79.8	77.0	80.3	4	4	8	4	0	0	09	2	3
2/11	14.2°S	113.0°W	2000	99	07	11	03	0	1010.5	X	XX	79.6	73.2	80.3	3	3	8	X	0	0	09	2	3
2/12	14.2°S	112.9°W	0300	99	09	14	01	1	1010.8	2	0.9	79.6	75.7	80.6	3	3	8	X	0	0	09	2	3
2/13	14.3°S	113.4°W	0200	99	09	15	03	0	1010.8	4	0.0	79.9	78.2	80.3	4	3	8	4	0	1	09	2	3
2/13	14.3°S	113.5°W	1900	99	06	17	02	2	1012.5	6	0.3	80.5	78.4	80.3	5	3	8	4	0	1	09	2	3
2/14	14.4°S	113.5°W	0100	99	09	10	02	1	1010.8	2	0.3	80.2	79.0	80.1	5	4	8	4	0	1	09	2	3
2/14	14.4°S	113.7°W	1900	99	09	15	02	2	1011.2	7	0.3	80.1	77.8	80.4	8	7	8	4	0	1	09	2	4
2/15	14.4°S	113.8°W	0200	99	09	15	01	1	1009.5	2	0.5	79.9	76.8	80.4	3	3	8	X	0	0	09	2	4
2/15	14.4°S	114.1°W	1900	99	08	12	16	8	1010.5	X	XX	78.2	72.9	80.2	8	8	8	4	X	X	09	2	4
2/16	14.4°S	114.2°W	0200	99	11	15	16	1	1009.5	3	0.3	79.9	75.6	80.4	4	3	8	4	0	1	09	2	4
2/16	14.3°S	114.5°W	2000	99	08	12	01	0	1010.5	X	XX	80.7	73.6	80.4	2	1	8	4	0	1	09	2	3
2/17	14.3°S	114.6°W	0200	99	09	10	01	0	1010.2	2	0.3	79.9	74.0	80.3	1	1	8	4	0	0	09	2	3
2/18	14.2°S	115.3°W	0200	99	03	21	02	0	1011.2	2	0.5	81.2	76.5	81.2	2	2	8	X	0	0	09	2	2
2/18	14.0°S	116.3°W	1500	99	07	13	02	2	1011.9	2	0.5	81.7	77.5	80.8	6	4	8	4	X	1	09	2	3
2/18	13.9°S	116.6°W	2000	99	04	16	03	2	1011.5	X	XX	82.8	78.7	81.0	7	5	8	4	7	X	10	2	3
2/19	13.8°S	117.3°W	0300	99	11	17	01	1	1011.5	2	1.0	81.5	78.3	80.5	2	2	X	X	X	X	10	2	3
2/19	13.6°S	118.2°W	1500	99	10	17	01	1	1011.5	2	0.7	81.9	77.8	80.1	6	6	8	X	0	0	10	2	3
2/20	13.5°S	118.3°W	0100	99	10	20	01	1	1010.5	3	0.2	80.9	77.9	80.9	3	2	8	4	0	6	10	2	3
2/20	12.8°S	119.5°W	2100	99	06	14	03	2	1012.2	7	1.0	83.1	79.8	80.7	6	6	8	4	0	0	10	2	3
2/21	12.4°S	120.0°W	0300	99	07	13	15	1	1011.5	2	0.7	81.1	79.2	80.5	3	3	8	4	X	X	10	2	3
2/21	10.6°S	122.5°W	1900	99	08	10	01	0	1012.9	8	0.3	83.9	78.5	80.3	1	1	8	4	0	0	10	2	2
2/22	10.1°S	123.0°W	0000	99	11	11	03	0	1010.2	7	1.0	83.0	77.2	80.9	3	3	8	4	0	0	10	2	2
2/22	08.3°S	124.4°W	1600	99	10	05	01	0	1011.5	2	1.0	82.1	79.5	78.9	1	1	8	4	0	0	10	2	2
2/23	07.4°S	126.1°W	0000	99	00	00	03	1	1009.8	7	0.7	88.7	82.5	80.8	4	2	8	4	0	1	10	2	2
2/24	04.5°S	128.6°W	0200	99	06	09	03	1	1010.2	3	0.3	79.8	76.1	80.0	4	1	8	4	0	5	10	2	2
2/24	04.0°S	129.0°W	0600	99	08	12	02	0	1012.2	2	1.4	80.0	78.5	78.9	X	X	X	X	X	X	10	2	2
2/24	01.9°S	129.5°W	1900	99	04	07	01	1	1013.2	0	0.3	80.1	78.4	78.9	3	3	2	4	0	0	10	3	1
2/25	01.4°S	129.6°W	0000	99	07	07	02	0	1009.8	7	1.2	83.5	79.5	79.9	3	3	8	4	0	0	10	3	1
2/25	00.1°S	130.0°W	0600	99	08	06	02	0	1012.2	2	1.0	80.3	77.4	78.1	3	3	8	X	X	X	10	3	1
2/25	01.5°S	130.0°W	1800	99	09	10	02	0	1012.9	2	1.0	79.1	75.4	78.0	3	3	8	X	0	0	10	3	1
2/26	02.1°S	129.9°W	0000	99	11	06	03	1	1009.8	6	0.3	78.9	74.6	80.0	5	2	1	X	4	0	11	3	1
2/26	03.0°S	130.0°W	0600	99	11	07	01	1	1011.5	2	1.0	79.5	75.5	79.4	3	3	1	X	X	X	11	3	1
2/26	04.2°S	130.0°W	1300	99	12	08	02	0	1010.8	2	0.7	78.9	75.2	79.1	3	3	8	4	0	0	11	3	1
2/26	05.0°S	130.1°W	2000	99	11	06	02	1	1011.5	7	1.0	80.2	74.9	80.5	4	4	8	X	0	0	11	3	1
2/27	05.5°S	130.1°W	0000	99	11	07	02	0	1009.1	7	1.4	80.8	76.1	81.0	1	1	1	5	0	0	11	3	2
2/27	06.5°S	129.9°W	0800	99	11	10	02	0	1011.2	X	XX	80.3	75.1	81.0	1	1	X	X	X	X	XX	X	2
2/27	08.2°S	130.0°W	1800	99	09	12	02	0	1013.2	2	2.0	81.1	75.6	80.7	1	1	1	5	4	0	14	4	3
2/28	09.0°S	130.0°W	0100	99	10	09	02	0	1009.5	7	1.0	80.9	74.8	81.8	1	1	8	X	0	0	13	2	2
2/28	11.7°S	130.0°W	2000	99	07	11	02	0	1012.9	2	1.0	83.0	75.2	82.7	2	2	1	X	0	0	13	2	2
2/28	12.3°S	130.0°W	2300	99	08	04	03	1	1010.5	7	1.0	82.5	77.6	85.5	6	6	8	4	0	0	13	2	2
3/1	13.5°S	130.0°W	0800	99	00	00	01	5	1011.9	0	0.0	81.7	76.7	83.7	X	X	X	X	X	X	XX	3	0
3/1	14.4°S	130.0°W	1500	99	00	00	03	X	1011.9	2	0.3	78.0	74.8	82.2	6	5	8	4	9	0	31	2	1

Table 6.--Weather observations (USWB 1210-F), Hugh M. Smith cruise 38 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
3/1	15.2°S	130.0°W	1800	99	07	02	03	2	1012.9	1	0.7	83.3	78.0	83.0	7	6	4	X	6	0	12	2	1
3/2	15.9°S	129.9°W	0000	99	36	11	21	6	1010.5	7	1.7	81.6	76.6	82.9	5	5	2	5	9	0	31	3	1
3/2	16.5°S	130.0°W	0600	99	22	05	00	X	1012.5	2	1.0	81.2	73.1	83.2	X	X	X	X	X	X	XX	X	X
3/2	18.0°S	130.2°W	1800	99	34	08	15	0	1012.9	2	1.7	82.7	74.3	82.3	3	3	2	5	0	1	15	3	3
3/3	18.0°S	131.2°W	0000	99	32	12	01	2	1010.5	6	0.7	82.3	75.2	82.7	5	5	2	X	6	0	32	2	3
3/3	18.0°S	132.0°W	0600	99	31	16	21	2	1012.9	2	1.0	81.3	74.4	82.3	X	X	X	X	X	X	31	2	3
3/3	18.0°S	133.5°W	1800	99	31	16	15	2	1012.5	2	0.3	79.6	76.5	81.8	7	7	8	X	0	0	31	2	3
3/4	17.9°S	135.2°W	0600	98	33	18	00	2	1014.6	2	1.0	81.6	78.8	82.2	X	X	X	X	X	X	31	2	3
3/4	17.6°S	136.2°W	1800	99	10	26	16	6	1010.8	1	0.9	77.8	76.0	81.7	8	8	5	X	X	X	34	2	3
3/5	17.8°S	137.0°W	0000	99	35	22	16	2	1007.8	7	2.0	80.7	76.2	81.7	8	X	7	5	7	X	34	2	3
3/5	18.0°S	137.6°W	0600	98	32	18	00	X	1009.1	2	0.7	81.2	78.5	82.7	X	X	X	X	X	X	34	2	3
3/5	17.6°S	139.5°W	1800	99	35	18	15	2	1009.5	2	1.7	81.1	75.7	81.8	7	4	1	5	7	8	34	2	3
3/6	17.9°S	140.2°W	0000	90	34	XX	65	2	1008.1	7	1.0	77.5	74.9	82.3	9	0	X	0	X	X	34	2	3
3/6	18.0°S	139.0°W	0400	98	34	06	02	2	1009.1	X	XX	81.8	75.5	82.6	8	7	8	X	X	X	XX	X	2
3/6	18.0°S	140.5°W	1800	99	34	15	02	2	1011.5	1	1.0	83.6	76.9	82.7	5	5	2	X	0	0	49	X	2
3/7	18.0°S	141.3°W	0000	99	33	16	02	2	1009.8	7	1.2	85.0	78.4	82.5	5	5	2	X	0	0	31	2	2
3/7	18.0°S	143.3°W	1500	99	30	22	60	2	1010.2	0	0.3	80.8	76.9	83.0	7	4	8	X	9	0	31	2	2
3/7	18.0°S	143.9°W	1800	99	33	25	15	2	1011.2	0	1.7	79.7	75.9	82.9	8	4	7	5	7	X	31	2	3
3/8	18.0°S	144.5°W	0000	99	31	22	02	2	1009.5	7	2.0	82.1	75.8	82.9	8	3	7	5	7	X	31	2	3
3/8	18.0°S	145.5°W	0600	99	29	16	02	2	1010.2	2	1.0	82.2	76.5	82.8	8	4	8	X	X	X	31	2	3
3/8	18.1°S	146.8°W	1800	99	30	11	01	2	1010.2	2	0.7	83.6	76.5	83.1	5	3	2	5	7	6	29	2	3
3/9	18.0°S	147.9°W	0000	99	30	16	02	2	1008.1	7	0.5	85.0	80.8	82.7	7	6	7	X	1	0	32	2	3
3/15	12.6°S	145.0°W	1900	99	10	08	02	2	1011.9	1	0.7	84.9	80.5	84.0	5	2	8	X	3	0	12	2	2
3/16	11.3°S	145.0°W	0600	99	10	05	21	2	1010.5	2	1.0	82.3	78.9	84.0	7	X	X	X	X	X	XX	X	2
3/16	10.9°S	145.0°W	1200	99	09	08	01	2	1009.5	7	0.7	82.3	76.4	83.7	5	5	2	X	X	X	XX	X	2
3/16	10.0°S	145.0°W	1800	99	05	08	02	1	1011.5	2	1.9	83.9	78.3	83.6	2	2	2	5	0	5	06	3	2
3/17	09.0°S	145.0°W	0000	99	03	06	02	0	1010.2	7	0.9	83.6	77.0	84.1	3	2	2	5	6	0	06	3	2
3/17	08.0°S	145.3°W	0600	99	04	04	02	1	1011.5	2	1.4	83.9	77.2	84.0	3	3	2	X	X	X	10	3	2
3/17	06.6°S	145.1°W	1800	99	05	09	02	0	1012.9	2	2.0	81.1	76.7	82.0	3	2	1	5	4	1	01	3	2
3/18	05.9°S	145.0°W	0100	99	08	09	02	0	1009.8	7	1.4	82.0	75.9	83.0	2	2	2	5	0	1	01	3	2
3/18	05.0°S	145.0°W	0600	99	10	10	02	0	1010.2	2	0.7	82.1	76.9	82.0	2	X	X	X	X	X	08	3	2
3/18	04.4°S	145.0°W	1200	99	09	12	02	0	1009.5	6	1.7	80.7	76.2	81.9	1	1	2	5	0	0	09	3	3
3/18	03.4°S	145.0°W	1800	99	09	13	01	0	1011.2	2	0.7	83.0	77.3	81.7	1	1	8	X	0	0	09	3	2
3/19	03.0°S	145.0°W	0000	99	09	13	02	0	1008.1	7	1.2	84.5	77.8	82.0	2	2	2	X	0	0	08	3	2
3/19	02.1°S	144.9°W	0600	99	08	12	02	0	1008.8	2	0.9	82.1	77.7	81.3	1	1	X	X	X	X	08	3	2
3/19	01.7°S	145.0°W	1200	99	10	11	02	0	1008.1	7	1.0	80.9	77.5	80.4	2	2	8	X	0	0	08	3	2
3/20	00.5°S	145.0°W	0000	99	09	09	02	0	1009.1	7	1.7	83.0	78.0	81.3	1	1	2	5	0	0	06	3	3
3/20	00.0°	145.0°W	0600	99	09	09	02	0	1009.5	2	0.7	81.6	77.1	81.0	1	1	2	X	0	0	06	3	2
3/20	00.7°N	145.0°W	1200	99	07	08	02	0	1009.1	7	0.9	80.0	76.2	80.2	1	1	8	X	0	0	XX	X	1
3/21	02.3°N	145.2°W	0000	99	06	08	02	0	1009.5	7	0.7	81.0	77.0	82.0	1	1	8	X	0	0	02	3	1
3/21	03.1°N	145.9°W	0600	99	06	09	02	0	1010.5	2	0.9	81.6	77.9	81.3	X	X	X	X	X	X	XX	X	X
3/21	04.7°N	147.0°W	1800	99	06	13	02	1	1011.5	2	1.0	80.7	76.9	80.6	5	5	2	X	0	0	06	2	3
3/22	05.6°N	147.4°W	0000	99	07	14	01	1	1009.1	6	2.0	82.0	78.2	82.0	5	5	2	5	4	0	06	2	1
3/22	06.5°N	148.0°W	0600	99	06	15	02	1	1010.5	2	0.9	81.6	78.2	81.4	X	X	X	X	X	X	XX	X	X
3/22	08.0°N	149.0°W	1900	99	04	12	03	2	1011.5	1	0.9	81.4	77.8	81.7	6	6	4	X	0	0	04	2	1

Table 6.--Weather observations (USWB 1210-F), Hugh M. Smith cruise 38 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
3/23	08.6°N	149.4°W	0000	99	04	16	02	2	1009.1	6	2.0	81.0	78.0	79.0	8	8	4	X	X	X	05	2	1
3/23	09.1°N	150.1°W	0600	99	07	14	02	2	1009.5	2	1.0	79.2	77.5	78.8	X	X	X	X	X	X	XX	X	X
3/23	10.7°N	150.9°W	1800	99	07	17	02	2	1010.5	1	1.0	80.4	75.9	79.0	6	6	2	X	0	0	05	2	3
3/24	11.7°N	151.6°W	0000	99	08	16	02	2	1009.8	6	2.0	78.8	76.6	79.3	6	2	2	4	4	0	10	2	2
3/24	12.4°N	152.2°W	0600	99	10	16	02	1	1011.2	2	1.2	79.2	76.7	78.0	X	X	X	X	X	X	XX	X	X
3/24	14.2°N	153.2°W	1800	99	07	08	03	1	1012.5	2	1.0	77.1	73.9	77.2	8	8	4	X	X	X	08	2	3
3/25	15.0°N	153.7°W	0100	98	08	19	14	2	1010.8	6	1.4	77.5	73.0	76.9	8	8	5	X	X	X	08	2	2
3/25	15.5°N	154.3°W	0600	98	10	13	60	2	1013.5	2	1.0	75.0	73.5	76.3	8	8	X	X	X	X	XX	X	X
3/25	17.3°N	154.7°W	1800	99	04	16	01	2	1013.2	2	0.7	75.0	70.5	74.5	7	7	4	X	0	0	49	X	2

Table 7.--Weather observations (USWB 1210-F), Charles H. Gilbert cruise 32[1/]

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/12	21.3°N	158.1°W	0600	98	10	18	02	1	1018.3	6	1.4	73.8	66.2	75.8	4	X	X	X	X	X	09	X	X
1/12	21.6°N	158.6°W	1800	98	09	21	01	0	1019.0	1	1.5	72.5	65.8	75.7	1	1	X	X	X	1	07	2	5
1/13	21.8°N	157.9°W	0000	98	10	20	03	0	1018.3	6	1.4	73.4	65.8	75.0	3	1	1	5	1	1	09	2	5
1/13	22.0°N	157.7°W	0600	98	10	19	02	0	1019.6	1	1.0	72.0	64.5	74.0	3	2	0	0	0	2	09	2	5
1/13	20.8°N	157.2°W	1800	99	09	01	01	X	1016.3	3	0.2	72.5	64.0	74.3	3	0	0	0	0	1	10	2	1
1/14	20.2°N	156.9°W	0000	99	09	05	03	1	1013.9	7	2.7	73.8	65.4	74.5	4	4	0	7	2	0	09	2	3
1/14	19.4°N	156.3°W	0600	98	09	01	03	1	1013.5	0	0.0	74.6	65.2	74.9	8	X	X	X	X	X	09	2	1
1/14	18.6°N	155.5°W	1200	98	09	21	XX	2	1013.5	2	0.7	72.0	66.3	74.7	8	X	X	X	X	X	12	2	5
1/14	17.8°N	155.4°W	1800	98	08	16	15	2	1012.2	6	0.7	73.0	65.5	75.4	8	8	4	6	X	X	08	2	3
1/15	17.0°N	155.0°W	0000	97	02	10	01	8	XXXXX	7	1.7	75.9	64.2	75.9	6	5	4	6	1	1	02	2	2
1/15	16.3°N	154.6°W	0600	99	10	11	15	2	1011.9	1	0.7	75.3	68.2	75.8	6	5	2	5	0	1	08	2	3
1/15	15.5°N	154.1°W	1200	99	13	11	01	1	1010.5	7	1.4	75.0	70.3	75.8	3	3	4	5	0	0	08	2	2
1/15	14.9°N	153.6°W	1800	98	13	11	03	1	1010.8	1	1.0	76.0	71.9	75.4	7	6	2	6	1	1	11	2	3
1/16	14.3°N	153.0°W	0000	98	09	19	02	2	1009.1	8	2.5	77.2	71.8	75.3	6	1	1	5	2	0	09	2	3
1/16	13.6°N	152.6°W	0600	98	11	16	02	2	1009.5	3	1.4	77.9	74.0	75.9	7	7	4	5	0	0	09	2	3
1/16	12.7°N	152.2°W	1200	97	11	15	02	2	1010.2	8	1.0	77.0	74.1	75.8	6	X	X	X	X	X	10	2	3
1/16	12.0°N	151.9°W	1800	98	10	16	01	2	1010.8	3	1.9	78.0	73.9	76.4	7	6	7	5	3	0	10	2	5
1/17	11.3°N	151.4°W	0000	98	09	13	02	2	1011.2	7	1.7	79.0	74.5	76.9	4	4	8	4	4	0	09	2	5
1/17	10.5°N	151.0°W	0600	98	07	16	02	1	1011.5	2	1.7	78.0	74.6	76.7	3	X	X	X	X	X	09	2	4
1/17	09.7°N	150.8°W	1200	98	07	22	00	1	1010.8	8	1.2	78.9	74.9	78.1	6	X	X	X	X	X	10	2	5
1/17	09.0°N	150.4°W	1800	98	07	21	01	1	1011.9	2	1.4	80.2	75.0	79.2	3	3	4	4	0	0	07	2	5
1/18	08.5°N	150.2°W	0000	98	04	20	03	1	1009.5	6	3.1	81.0	76.4	80.0	7	7	6	4	0	0	06	2	5
1/18	07.6°N	149.5°W	0600	XX	07	13	86	8	1010.2	2	2.0	80.0	76.2	80.0	X	X	X	X	X	X	06	2	5
1/18	07.1°N	149.2°W	1200	90	14	30	82	8	1009.8	0	0.0	77.2	77.0	79.0	X	X	X	X	X	X	07	2	3
1/18	06.4°N	148.6°W	1800	97	12	12	02	8	1010.2	2	0.7	78.7	75.3	79.2	5	5	6	5	0	0	12	2	3
1/19	05.8°N	147.8°W	0000	98	11	11	01	2	1008.1	8	2.5	80.1	76.2	78.7	5	3	2	5	3	8	11	2	5
1/19	05.0°N	147.2°W	0600	98	15	07	01	1	1009.8	2	2.0	80.0	76.2	80.0	X	X	X	X	X	X	11	2	5
1/19	04.4°N	146.9°W	1200	97	15	13	01	2	1008.8	6	1.4	79.3	75.2	79.7	5	X	X	X	X	X	11	2	3
1/19	03.7°N	146.4°W	1800	99	15	15	02	1	1010.5	2	1.9	79.1	71.6	78.3	5	3	4	5	3	1	11	2	3
1/20	03.0°N	145.9°W	0000	99	14	15	02	2	1009.8	7	2.0	79.3	72.2	78.5	6	6	4	5	5	0	11	2	3
1/20	02.5°N	145.6°W	0600	98	12	16	01	1	1010.2	1	1.4	78.1	72.0	78.3	4	X	X	X	X	X	11	2	3
1/20	01.9°N	145.4°W	1200	XX	09	10	00	1	1010.5	8	0.7	76.9	71.3	76.7	1	1	1	5	0	0	11	2	3
1/20	01.0°N	144.9°W	1800	99	11	12	02	0	1012.5	2	2.0	77.5	72.5	76.3	3	3	2	3	0	0	07	2	3
1/21	00.2°N	144.5°W	0000	98	12	12	03	1	1010.8	6	1.7	78.7	72.5	76.7	5	2	4	6	0	1	12	2	3
1/21	00.5°S	144.0°W	0600	99	10	15	02	1	1011.2	1	1.5	77.1	72.7	76.4	1	X	X	X	X	X	09	2	3
1/21	01.2°S	143.7°W	1200	99	10	13	02	0	1011.9	7	1.0	77.0	73.0	77.0	1	X	X	X	X	X	09	2	3
1/21	02.2°S	143.3°W	1800	99	10	15	03	1	1013.2	1	1.4	79.3	74.4	77.8	4	4	2	5	0	0	10	2	3
1/22	02.9°S	142.8°W	0000	99	11	18	01	1	1010.5	8	2.2	79.0	71.8	78.1	4	4	7	5	0	0	09	2	4
1/22	03.7°S	142.5°W	0600	99	09	17	00	X	1011.9	2	1.7	77.5	72.3	78.3	X	X	X	X	X	X	09	2	4
1/22	04.4°S	142.0°W	1200	98	10	14	00	0	1010.5	6	1.4	79.0	72.2	77.5	3	X	X	X	X	X	09	2	4

[1/] All columns in USWB 1210-F are not included here. Those deleted are:

Column	2	Day of week	Column	23	Course of ship
"	3	Octant	"	24	Speed of ship
"	13	Barometer as read	"	31	Diff. sea-air, °F.
"	14	Barometer as corrected	"	32	Dew point, °F.
"	17	Air temperature, °F.			

Table 7.--Weather observations (USWB 1210-F), Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/22	05.2°S	141.8°W	1800	99	07	14	01	0	1012.2	1	1.7	78.9	71.7	78.4	1	1	1	5	0	0	08	2	4
1/23	06.0°S	141.5°W	0000	98	08	16	03	1	1010.2	7	2.0	80.0	74.2	78.3	8	8	4	5	X	X	09	2	4
1/23	06.9°S	141.1°W	0600	98	07	13	03	2	1011.9	2	2.0	80.0	72.9	79.0	6	X	X	X	X	X	07	2	3
1/23	07.8°S	140.8°W	1200	99	06	14	00	1	1010.5	6	1.5	79.6	73.6	79.2	2	2	1	5	0	0	07	2	3
1/23	08.8°S	140.5°W	1800	99	05	16	02	0	1012.9	2	2.0	82.5	73.2	80.9	2	2	4	5	0	0	07	2	3
1/25	09.2°S	140.1°W	1800	99	08	16	01	0	1014.2	1	1.4	80.0	71.7	80.7	3	3	1	5	0	0	08	2	4
1/26	09.5°S	140.0°W	0000	99	05	16	03	1	1011.5	7	1.5	82.2	73.2	81.2	6	6	1	5	0	0	07	2	4
1/26	09.5°S	140.1°W	1800	99	09	16	02	1	1013.2	2	1.7	80.9	73.3	80.8	2	2	2	5	0	0	09	2	3
1/27	09.7°S	139.5°W	0000	99	07	12	02	1	1010.2	7	1.7	82.0	74.5	81.7	2	2	2	5	0	0	07	2	2
1/27	09.9°S	139.0°W	1800	98	07	04	03	1	1012.9	1	1.7	82.2	74.3	81.2	5	5	2	5	0	0	07	2	2
1/28	10.4°S	138.7°W	0000	97	05	10	03	1	1013.2	6	1.0	80.3	75.1	81.3	8	8	2	5	X	X	06	2	2
1/28	09.5°S	138.9°W	1800	98	07	04	02	1	1013.2	2	2.0	82.0	74.0	80.8	3	3	4	5	0	0	07	2	2
1/29	09.0°S	139.4°W	0000	98	03	07	02	1	1010.5	7	1.9	84.0	75.9	82.3	4	4	2	5	0	0	04	2	2
1/29	08.8°S	139.3°W	1800	98	07	14	02	1	1012.2	2	1.4	80.3	73.0	80.7	2	2	2	5	0	0	07	2	2
1/30	08.3°S	139.3°W	0000	98	07	13	02	1	1009.5	7	2.0	80.2	75.0	81.6	4	4	2	5	0	0	07	2	3
1/30	08.3°S	139.5°W	0600	XX	10	19	02	X	1010.2	2	2.0	80.0	72.0	81.3	X	X	X	X	X	X	10	2	3
1/30	07.8°S	140.4°W	1800	98	07	14	02	1	1012.9	1	1.7	79.5	73.6	80.2	4	4	1	5	0	0	07	2	4
1/31	08.2°S	140.6°W	0000	98	06	13	02	1	1009.1	6	3.4	81.5	73.1	81.0	3	3	1	5	0	0	07	2	4
1/31	08.7°S	140.1°W	1800	98	05	08	02	1	1012.5	1	1.4	83.4	75.5	80.9	6	5	2	5	4	0	06	2	3
2/2	09.3°S	140.1°W	1800	92	07	12	02	1	1010.8	1	1.4	81.5	74.7	81.3	5	5	2	4	0	0	06	4	3
2/3	09.4°S	140.3°W	0000	98	05	13	02	1	1007.8	6	2.4	82.8	75.3	81.7	2	2	2	4	0	0	06	4	3
2/3	09.5°S	140.1°W	1800	98	21	04	01	0	1010.5	1	1.2	81.0	73.1	81.6	2	2	1	4	4	0	15	2	1
2/4	09.8°S	140.3°W	0000	98	05	10	03	1	1007.8	6	1.7	82.7	74.4	82.2	5	2	4	4	4	9	03	2	3
2/4	09.4°S	139.9°W	1800	98	08	11	02	1	1010.5	1	1.4	82.2	73.8	81.0	3	3	4	4	0	0	08	2	4
2/5	08.9°S	139.9°W	1800	98	11	14	03	1	1011.5	1	1.4	82.6	76.4	81.2	6	5	2	5	0	2	09	3	4
2/6	08.8°S	140.1°W	0000	98	10	17	01	2	1008.5	6	2.0	82.7	74.5	81.1	4	3	2	5	0	2	09	4	4
2/6	08.8°S	140.0°W	1800	98	10	16	02	1	1010.2	3	1.0	81.5	75.4	80.9	2	2	1	5	0	0	12	3	5
2/8	09.0°S	140.2°W	0000	98	07	13	02	1	1006.8	7	1.4	83.0	74.5	81.4	4	4	1	5	0	0	07	2	2
2/9	08.9°S	140.1°W	1800	98	14	10	01	1	1008.8	1	1.2	81.8	73.9	81.1	2	2	1	5	0	0	09	2	4
2/10	09.0°S	140.2°W	1200	98	27	05	02	0	1007.5	6	1.2	81.2	74.6	80.7	1	1	1	5	0	0	XX	3	3
2/10	09.7°S	140.9°W	1800	98	09	07	02	0	1010.5	2	2.4	84.5	75.5	81.8	2	2	4	5	0	0	09	2	2
2/11	10.1°S	141.6°W	0000	99	04	06	01	0	1008.1	7	1.5	83.1	75.2	82.0	2	2	1	5	0	0	13	2	2
2/11	10.8°S	142.3°W	0600	98	03	06	02	0	1010.2	2	2.0	83.0	75.0	81.8	2	2	1	5	0	0	13	2	3
2/11	11.2°S	142.9°W	1200	99	07	09	02	1	1007.5	6	1.4	81.2	73.8	80.9	4	X	X	X	X	X	13	2	3
2/11	11.9°S	143.5°W	1800	99	06	06	02	1	1010.8	2	2.0	84.5	75.0	82.5	3	3	4	5	0	0	13	2	3
2/12	12.5°S	144.2°W	0000	99	07	05	02	1	1008.8	7	1.0	84.9	74.8	84.3	5	5	1	5	0	0	11	4	3
2/12	13.0°S	145.0°W	0600	99	10	06	01	1	1009.8	2	1.4	84.5	74.5	84.2	1	1	1	5	0	0	13	4	3
2/12	13.5°S	145.5°W	1200	99	15	06	02	0	1008.5	7	1.5	82.8	74.5	82.8	1	1	1	5	0	0	11	4	3
2/12	14.3°S	146.1°W	1800	99	04	07	02	0	1010.2	2	1.4	84.2	74.5	83.5	1	1	1	5	0	0	11	4	3
2/13	14.7°S	146.3°W	0000	99	02	09	01	0	1007.5	6	1.2	85.0	75.5	84.8	2	2	2	5	0	5	09	2	2
2/13	15.0°S	146.7°W	0600	98	00	06	02	0	1010.5	2	2.0	82.5	75.0	82.0	2	2	4	5	0	0	00	2	2
2/13	15.7°S	146.6°W	1800	98	13	02	02	0	1011.2	2	1.0	82.5	74.0	83.0	1	1	2	5	0	0	00	2	0
2/14	16.2°S	146.9°W	0000	99	23	01	15	1	1009.5	6	1.9	85.7	76.3	86.4	5	3	3	5	8	1	20	7	5
2/14	16.4°S	147.8°W	0600	98	06	04	15	1	1010.8	2	1.4	83.0	75.5	83.7	4	4	3	5	8	1	18	7	5
2/14	16.9°S	148.6°W	1200	98	09	11	15	2	1009.1	8	2.0	82.2	76.0	83.3	7	3	2	5	3	1	13	5	3

Table 7.--Weather observations (USWB 1210-F), Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
2/20	15.3°S	147.1°W	0000	99	06	06	01	1	1010.5	7	1.4	83.6	76.8	84.2	1	1	1	5	0	0	06	2	2
2/20	14.9°S	146.3°W	0600	99	07	09	00	X	1011.2	2	1.0	84.3	76.5	84.0	X	X	X	X	X	X	07	2	2
2/20	14.4°S	145.6°W	1200	99	13	08	16	1	1010.2	7	1.4	82.9	76.9	83.5	6	6	3	5	X	X	XX	X	2
2/20	13.9°S	145.0°W	1800	99	08	09	01	1	1012.5	2	2.4	83.8	76.0	84.2	4	4	3	5	0	0	08	2	2
2/21	13.3°S	144.5°W	0000	98	07	08	15	2	1010.2	7	1.7	83.0	75.1	84.7	7	6	3	5	4	1	10	2	2
2/21	12.7°S	143.9°W	0600	98	05	06	00	X	1011.2	2	1.4	80.0	80.0	83.8	9	X	X	X	X	X	05	2	2
2/21	12.2°S	143.4°W	1200	98	06	10	15	2	1010.5	8	1.4	80.6	74.3	82.9	8	X	X	X	X	X	XX	X	2
2/21	11.7°S	142.6°W	1800	98	07	10	01	1	1014.2	2	2.0	83.2	75.5	82.5	4	4	3	5	0	0	07	2	2
2/22	11.1°S	142:1°W	0000	98	10	16	15	2	1011.9	6	1.4	81.8	74.8	82.6	7	3	7	5	4	6	07	2	4
2/22	10.6°S	141.5°W	0600	98	10	11	00	X	1012.9	2	1.4	83.0	75.0	82.2	9	X	X	X	X	X	10	2	2
2/22	10.1°S	141.1°W	1200	98	12	13	15	1	1010.5	6	1.7	81.8	75.0	82.1	2	X	X	X	X	X	XX	2	4
2/22	09.5°S	140.6°W	1800	99	13	11	01	0	1012.9	2	2.0	82.0	75.5	81.8	1	1	2	5	0	0	13	2	2
2/23	09.3°S	140.1°W	1800	98	12	12	03	1	1013.9	2	2.0	81.9	75.1	81.6	5	5	3	5	0	0	12	2	2
2/24	09.4°S	139.9°W	0000	98	06	12	01	1	1011.5	6	1.4	82.2	74.2	82.1	2	2	1	5	0	0	08	2	3
2/24	09.5°S	139.8°W	1800	98	06	06	01	0	1015.2	2	2.0	82.3	75.0	81.8	1	1	1	5	0	0	06	2	2
2/25	09.8°S	139.4°W	0000	99	07	05	03	1	1012.2	6	2.2	82.0	75.1	83.1	6	6	1	5	0	0	07	2	3
2/26	10.3°S	139.9°W	0000	99	06	07	03	1	1010.8	6	2.2	82.7	74.9	84.4	4	4	2	5	0	1	06	2	3
2/26	10.3°S	138.7°W	1800	99	06	05	01	1	1013.5	2	1.5	83.2	74.8	82.0	1	1	1	5	0	0	18	3	2
2/27	09.7°S	138.8°W	0000	98	33	05	02	0	1009.8	6	2.0	83.0	75.1	84.6	1	1	1	5	0	0	10	4	2
2/28	09.3°S	139.6°W	0600	98	06	07	XX	X	1012.2	2	2.0	83.5	74.5	82.8	X	X	X	X	X	X	XX	X	X
3/1	08.4°S	140.6°W	0000	98	06	08	03	2	1010.5	6	1.7	83.3	76.1	83.5	6	6	2	5	0	0	05	4	2
3/1	07.8°S	140.4°W	1800	98	12	10	02	1	1012.9	1	1.4	83.0	75.8	81.8	3	3	2	5	0	0	35	4	2
3/3	09.0°S	139.9°W	0600	98	00	15	00	X	1012.5	2	1.4	83.0	75.5	82.5	9	X	X	X	X	X	00	2	2
3/3	08.7°S	139.9°W	1800	98	00	11	03	2	1013.2	2	1.7	82.0	75.0	81.5	7	7	2	5	3	0	00	2	2
3/4	09.0°S	140.1°W	0000	98	31	07	03	2	1010.2	6	1.7	84.5	74.5	82.3	8	8	2	5	6	X	31	2	2
3/4	09.0°S	140.1°W	1800	98	09	04	01	1	1012.5	2	1.7	83.3	75.0	82.7	3	3	2	5	0	0	09	2	2
3/5	08.8°S	140.5°W	0000	98	05	08	02	0	1009.5	6	1.9	82.8	75.0	83.1	2	2	2	5	0	1	04	2	2
3/5	08.8°S	140.2°W	1800	98	05	12	03	1	1011.2	3	0.7	82.0	76.0	82.1	6	6	4	5	0	0	08	2	3
3/6	08.8°S	140.4°W	0000	98	06	15	02	1	1008.8	7	2.0	82.5	75.0	82.6	4	4	2	5	0	0	06	2	3
3/6	09.2°S	139.8°W	1800	98	10	14	02	1	1012.5	X	XX	82.6	75.5	82.5	4	3	1	5	0	1	09	2	4
3/7	09.7°S	139.4°W	0000	98	08	16	02	1	1010.2	9	2.0	82.9	75.9	82.7	4	4	2	5	6	0	08	2	4
3/7	09.8°S	139.2°W	1800	98	04	04	02	1	1012.9	2	1.4	83.0	76.0	83.0	3	3	2	5	0	0	04	2	2
3/8	09.3°S	139.7°W	0000	98	05	11	01	0	1009.8	7	2.2	84.7	77.3	83.9	2	2	1	5	0	1	04	2	2
3/8	09.0°S	140.2°W	1800	98	09	12	15	2	1012.5	3	1.2	82.8	77.2	83.0	6	5	3	5	0	1	02	2	3
3/8	09.2°S	140.2°W	2300	98	11	10	02	1	1009.8	7	1.7	84.8	78.0	83.8	5	5	3	5	0	1	11	2	2
3/13	08.6°S	140.2°W	0000	98	07	11	02	1	1010.2	7	1.9	83.3	76.3	83.3	1	1	1	5	0	0	07	4	3
3/13	07.9°S	140.8°W	0600	98	09	12	02	0	1011.9	2	1.7	83.8	77.0	81.5	1	1	2	5	0	0	09	2	3
3/13	07.1°S	141.2°W	1200	98	09	11	02	0	1010.5	6	1.5	81.5	76.1	81.5	1	1	2	5	0	0	05	2	3
3/13	06.3°S	141.7°W	1800	98	10	12	02	0	1012.5	2	1.4	83.6	76.8	81.2	2	2	2	5	0	0	10	2	2
3/14	05.6°S	142.0°W	0000	98	09	11	03	1	1008.5	7	2.4	82.8	77.2	82.2	5	5	2	5	0	0	09	4	3
3/14	04.8°S	142.5°W	0600	98	13	10	02	1	1010.5	2	2.0	83.0	77.3	80.8	2	2	2	5	0	0	09	4	3
3/14	04.0°S	142.9°W	1200	98	12	09	01	0	1009.8	8	1.4	81.0	76.2	80.9	1	1	1	5	0	0	12	3	3
3/14	03.3°S	143.3°W	1800	98	09	08	02	1	1011.5	2	1.4	82.0	76.8	81.1	4	4	2	5	0	0	11	3	3
3/15	02.5°S	143.7°W	0000	98	05	09	02	1	1008.1	8	3.2	82.2	76.6	81.7	6	6	2	5	0	0	05	5	3
3/15	01.9°S	144.1°W	0600	98	07	10	02	1	1009.5	2	2.0	82.3	76.0	80.5	2	2	2	5	0	0	09	3	2

Table 7.--Weather observations (USWB 1210-F), Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
3/15	01.1°S	144.6°W	1200	99	07	07	00	1	1009.5	7	1.4	79.3	75.0	79.1	4	4	2	5	0	0	XX	X	2
3/15	00.4°S	144.9°W	1800	99	08	08	02	1	1012.2	2	2.0	82.3	76.0	79.5	2	2	2	5	0	0	02	3	2
3/16	00.3°N	145.3°W	0000	99	09	05	01	1	1009.1	7	2.4	82.0	75.0	83.5	4	4	1	5	0	0	03	2	3
3/16	01.0°N	145.9°W	0600	99	00	00	15	1	1010.8	2	1.7	82.0	74.8	81.6	3	3	2	5	0	0	06	2	3
3/16	02.1°N	146.2°W	1200	99	00	00	02	0	1010.2	7	1.5	81.0	74.3	81.1	1	1	2	5	0	0	03	2	3
3/16	02.8°N	146.7°W	1800	99	28	06	02	0	1013.2	2	2.0	81.8	75.6	80.0	2	2	2	5	0	0	00	2	2
3/17	03.6°N	147.1°W	0000	99	33	02	15	1	1011.2	8	2.2	83.0	75.9	84.7	4	3	2	5	4	0	01	2	3
3/17	04.4°N	147.4°W	0600	98	07	12	03	1	1012.9	2	1.7	80.0	75.5	80.0	5	5	4	4	0	0	03	2	3
3/17	05.2°N	147.8°W	1200	98	09	15	01	2	1011.5	8	2.0	79.1	75.0	80.1	7	2	2	5	3	0	03	2	3
3/17	06.1°N	148.2°W	1800	98	20	07	01	1	1013.2	2	1.7	82.8	76.2	80.5	2	2	2	5	0	0	06	2	3
3/18	06.7°N	148.6°W	0000	99	00	00	01	0	1010.2	7	2.4	82.8	75.7	83.7	1	0	0	9	0	2	05	2	4
3/18	07.5°N	148.7°W	0600	99	08	07	01	0	1012.2	2	2.0	82.8	75.3	81.8	1	1	4	4	0	0	05	2	4
3/18	08.0°N	149.3°W	1200	98	09	10	15	1	1010.5	8	2.2	80.4	75.7	80.0	7	7	2	5	0	0	04	2	4
3/18	08.8°N	149.8°W	1800	98	04	18	02	2	1011.9	2	1.7	78.0	74.8	78.0	7	7	4	5	0	0	05	2	4
3/19	09.3°N	150.4°W	0000	98	06	16	02	2	1010.2	6	2.0	79.2	74.8	79.1	7	6	7	5	4	0	06	2	6
3/19	10.0°N	150.7°W	0600	98	07	17	01	1	1011.2	2	2.0	79.0	74.5	78.1	1	1	7	5	0	0	06	2	6
3/19	10.8°N	151.2°W	1200	XX	05	17	60	6	1010.8	7	1.5	75.9	72.7	78.0	7	X	X	X	X	X	XX	2	6
3/19	11.4°N	151.7°W	1800	98	04	14	01	1	1012.9	2	2.0	77.5	74.5	77.3	3	3	2	5	0	0	05	2	6
3/20	12.2°N	152.1°W	0000	98	04	13	15	1	1011.9	8	1.7	77.3	73.0	78.1	7	6	7	5	0	1	03	2	6
3/20	12.9°N	152.5°W	0600	98	05	14	01	1	1012.9	2	1.7	77.8	72.6	76.9	3	3	4	5	0	0	03	2	4
3/20	13.5°N	152.9°W	1200	XX	07	14	00	1	1012.9	8	1.4	75.5	71.0	76.3	6	6	2	5	0	0	04	2	5
3/20	14.2°N	153.2°W	1800	98	06	14	03	2	1013.5	2	1.7	76.0	70.3	75.3	6	6	2	5	0	0	04	2	4
3/21	15.1°N	153.6°W	0000	99	07	10	02	1	1013.2	8	1.4	76.9	70.4	76.8	5	5	1	5	0	0	04	2	3
3/21	15.8°N	154.3°W	0600	98	05	10	01	1	1014.2	2	2.0	76.0	68.8	75.5	0	0	0	9	0	0	04	2	2
3/21	16.5°N	154.8°W	1200	99	08	06	02	0	1015.2	8	0.5	74.0	66.9	75.0	1	1	1	5	0	0	04	2	3
3/21	17.3°N	155.3°W	1800	99	03	03	02	0	1015.9	2	1.4	74.0	67.0	74.1	1	1	1	5	0	0	04	2	3
3/22	18.0°N	155.8°W	0000	99	15	06	02	0	1013.9	8	1.9	76.0	67.2	75.2	1	1	1	5	0	0	09	6	3
3/22	18.8°N	156.3°W	0600	99	00	00	02	0	1014.6	2	0.7	74.3	65.2	75.0	1	1	1	5	0	0	09	4	2
3/22	19.5°N	156.7°W	1200	99	17	05	02	0	1013.9	8	0.9	73.3	67.2	74.6	1	1	1	5	0	0	XX	X	0
3/22	20.4°N	157.3°W	1800	98	36	13	15	1	1013.5	3	0.7	73.3	66.2	73.8	8	8	6	4	X	X	33	2	2
3/23	20.9°N	157.7°W	0000	98	32	06	02	2	1013.2	8	1.2	72.0	63.5	74.0	8	2	1	5	7	3	35	2	2

Table 8.--Weather observations (USWB 1210-F), John R. Manning cruise 34[1/]

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/6	18.4°N	155.0°W	1800	98	08	24	02	1	1017.6	2	1.7	74.5	71.0	75.5	3	3	2	5	0	0	08	2	3
1/7	18.1°N	154.4°W	0000	98	08	24	03	2	1015.6	7	2.0	77.5	73.2	75.5	8	8	4	5	X	X	08	2	3
1/7	17.8°N	153.9°W	0600	98	08	25	01	1	1016.6	3	1.0	74.5	69.5	76.0	5	5	2	5	0	0	08	2	3
1/7	17.5°N	153.5°W	1200	98	08	26	03	1	1016.9	8	0.2	75.0	71.0	75.5	7	7	2	5	0	0	08	2	4
1/7	17.3°N	153.1°W	1800	98	08	24	03	2	1020.3	1	1.7	70.4	65.0	76.0	7	5	8	5	6	0	08	2	4
1/8	17.1°N	152.6°W	0000	98	05	24	02	2	1015.6	7	1.4	74.6	69.5	76.0	7	7	2	5	0	0	06	2	4
1/8	16.8°N	152.1°W	0600	98	05	23	02	2	1016.3	2	0.2	73.0	68.5	75.9	6	6	2	5	0	0	06	2	4
1/8	16.4°N	151.5°W	1200	98	06	22	01	1	1015.2	8	0.3	72.0	66.6	75.0	3	3	2	5	0	0	06	2	4
1/8	16.1°N	151.1°W	1800	98	06	24	01	0	1016.9	2	0.5	73.0	67.5	75.2	3	3	2	5	0	0	06	2	4
1/9	15.8°N	150.6°W	0000	98	06	23	01	0	1013.2	7	1.1	76.2	69.1	75.3	2	2	2	5	0	0	06	2	4
1/9	15.5°N	150.1°W	0600	98	06	25	03	1	1014.9	3	0.5	73.2	67.8	75.7	6	6	4	4	0	0	06	2	3
1/9	15.1°N	149.6°W	1200	98	06	26	01	1	1012.9	8	0.7	74.0	68.0	76.0	2	2	4	5	0	0	06	2	3
1/9	14.8°N	149.0°W	1800	98	05	20	03	1	1014.2	2	0.4	73.3	68.5	76.4	7	7	4	5	0	0	06	2	3
1/10	14.5°N	148.3°W	0000	98	05	18	15	2	1011.9	8	0.7	75.6	69.0	76.3	8	8	4	5	X	X	05	2	3
1/10	14.3°N	147.8°W	0600	98	05	19	02	2	1012.5	1	0.2	74.0	68.5	76.5	8	8	4	5	X	X	05	2	3
1/10	14.0°N	147.3°W	1200	98	08	19	02	2	1011.5	6	0.2	73.5	70.0	76.4	8	8	4	5	X	X	08	2	3
1/10	13.8°N	146.7°W	1800	98	09	15	20	2	1013.9	2	2.5	72.9	69.0	77.0	8	8	4	5	X	X	09	3	3
1/11	13.5°N	146.2°W	0000	98	09	11	02	2	1010.8	8	1.7	75.1	70.6	76.9	8	8	4	5	X	X	09	3	3
1/11	13.1°N	145.6°W	0600	97	12	16	50	8	1013.9	2	1.7	75.5	67.5	76.5	8	8	4	4	X	X	10	3	3
1/11	12.8°N	145.1°W	1200	97	12	14	02	6	1012.2	6	1.7	75.8	71.1	75.2	8	8	4	4	X	X	10	3	3
1/11	12.5°N	144.5°W	1800	96	04	29	51	6	1016.3	2	3.4	72.1	69.2	76.2	8	8	4	4	X	X	05	3	3
1/12	12.2°N	144.0°W	0000	98	05	22	50	6	1012.5	5	1.7	73.0	68.7	76.3	8	8	4	4	X	X	05	3	3
1/12	11.8°N	143.5°W	0600	98	05	19	01	2	1013.9	1	1.7	75.5	70.5	76.3	7	7	4	5	X	X	05	3	3
1/12	11.4°N	142.8°W	1200	98	01	09	02	1	1012.2	4	0.0	74.1	70.0	76.3	3	3	1	5	0	0	01	3	3
1/12	11.0°N	142.1°W	1800	98	02	17	02	0	1014.6	2	2.5	76.0	70.5	76.2	4	2	2	5	6	0	02	3	3
1/13	10.7°N	141.5°W	0000	98	03	17	02	0	1010.8	6	3.4	75.3	70.9	77.0	4	4	2	5	0	0	04	4	3
1/13	10.2°N	141.0°W	0600	98	06	14	03	1	1013.2	1	3.4	76.3	71.3	76.9	8	2	4	4	1	X	06	4	3
1/13	09.8°N	140.4°W	1200	98	06	10	15	2	1010.5	7	2.0	75.0	71.5	76.2	7	7	4	5	X	X	06	4	2
1/13	09.4°N	139.8°W	1800	98	03	15	02	2	1012.5	2	1.7	75.5	72.2	76.3	7	4	2	5	6	X	03	4	2
1/14	08.9°N	139.2°W	0000	98	04	17	01	1	1008.5	6	3.4	76.9	73.1	77.5	4	3	2	5	5	0	04	4	3
1/14	08.6°N	138.6°W	0600	98	04	14	03	2	1011.2	2	2.5	77.3	73.9	77.1	7	2	2	5	5	X	04	3	2
1/14	08.0°N	137.9°W	1200	98	06	16	01	1	1008.1	6	1.4	77.3	74.8	79.0	4	4	2	5	0	0	06	3	2
1/14	07.7°N	137.1°W	1800	98	06	16	01	0	1011.2	1	1.7	80.0	73.5	79.7	2	2	2	5	0	0	08	3	3
1/15	07.3°N	136.4°W	0000	98	06	15	02	0	1006.8	6	3.2	81.2	74.9	81.0	2	2	2	5	0	0	06	3	3
1/15	06.8°N	135.7°W	0600	98	05	12	02	0	1009.8	1	1.7	80.0	74.2	79.7	3	3	2	5	0	0	07	3	3
1/15	06.3°N	135.0°W	1200	98	06	12	02	0	1007.8	7	1.7	79.0	74.0	79.5	2	1	2	5	4	0	05	4	2
1/15	05.9°N	134.5°W	1800	98	06	10	15	1	1010.5	1	2.5	79.7	75.5	79.0	4	2	2	5	5	0	06	3	2
1/16	05.4°N	133.9°W	0000	98	10	09	15	1	1007.1	7	2.5	79.1	74.6	80.7	4	2	2	5	7	0	10	3	2
1/16	05.0°N	132.3°W	0600	98	11	08	03	0	1010.2	2	2.5	79.5	75.5	80.0	3	2	2	5	4	0	11	4	2
1/16	04.6°N	132.7°W	1200	98	13	08	02	1	1007.5	6	2.4	78.4	74.2	78.6	6	3	2	5	6	0	13	4	2

[1/] All columns in USWB 1210-F are not included here. Those deleted are:

Column	2	Day of week	Column	23	Course of ship
"	3	Octant	"	24	Speed of ship
"	13	Barometer as read	"	31	Diff. sea-air, °F.
"	14	Barometer as corrected	"	32	Dew point, °F.
"	17	Air temperature, °F.			

Table 8.--Weather observations (USWB 1210-F), John R. Manning cruise 34 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/16	04.4°N	132.3°W	1800	98	11	20	15	8	1011.2	1	3.1	80.0	75.3	79.2	3	2	2	5	4	0	11	3	2
1/17	04.1°N	132.2°W	0600	97	13	12	20	2	1010.2	1	1.7	77.5	74.9	79.5	8	8	3	4	X	X	13	3	4
1/17	03.5°N	132.2°W	1800	97	13	12	50	2	1011.5	1	3.4	78.0	74.2	76.3	7	7	4	4	0	0	13	3	2
1/18	03.5°N	132.1°W	0000	98	12	15	02	1	1007.5	7	3.4	78.2	73.4	76.7	6	6	6	5	0	0	13	3	2
1/18	03.0°N	132.1°W	0600	98	18	08	01	1	1011.2	1	1.7	76.5	72.5	76.1	1	0	0	6	1	0	14	3	2
1/18	02.4°N	132.2°W	1200	98	15	09	01	0	1008.8	7	1.7	75.3	71.5	75.7	1	1	5	5	0	0	16	3	2
1/18	01.8°N	132.3°W	1800	98	13	12	02	0	1010.5	1	1.2	78.2	72.5	75.8	1	0	0	6	8	0	16	3	2
1/19	01.8°N	132.5°W	0000	98	13	06	02	0	1008.5	6	2.5	77.0	71.7	77.0	1	1	4	5	0	0	13	3	2
1/19	01.8°N	132.6°W	0600	98	12	13	03	1	1010.5	2	2.5	77.2	72.8	76.0	7	7	4	5	X	X	12	2	2
1/19	01.5°N	132.1°W	1200	98	12	14	02	2	1008.1	3	1.7	76.5	72.3	75.9	7	3	2	5	1	X	12	2	2
1/19	01.5°N	132.0°W	1800	98	12	10	03	1	1011.2	1	2.5	77.8	73.1	76.1	6	6	2	5	0	0	12	3	2
1/20	01.4°N	132.2°W	0000	98	13	12	15	1	1008.1	6	1.7	79.0	74.0	76.9	6	4	2	4	2	0	13	3	2
1/20	00.8°N	132.1°W	0600	98	14	09	01	1	1012.2	1	2.5	77.4	73.0	76.0	1	1	1	5	0	0	14	3	2
1/20	00.0°	132.3°W	1800	98	12	14	01	1	1012.9	1	1.7	76.1	73.0	75.8	2	1	2	5	1	0	12	3	2
1/21	00.3°S	132.3°W	0000	98	12	13	03	1	1009.5	7	1.7	77.1	72.3	76.5	6	5	2	5	1	0	12	2	2
1/21	01.0°S	132.2°W	0600	98	13	14	01	1	1011.2	2	1.7	76.3	72.0	75.9	1	1	8	5	1	0	12	2	2
1/21	01.9°S	132.0°W	1800	98	10	12	01	0	1013.5	1	1.7	77.9	72.9	75.5	1	1	8	5	0	0	10	3	2
1/22	02.0°S	132.0°W	0000	98	10	08	02	0	1010.5	6	1.7	76.1	72.2	76.9	3	3	2	5	0	0	10	3	2
1/22	02.6°S	132.0°W	0600	98	10	13	02	0	1012.2	2	1.5	76.8	72.1	76.8	1	1	2	5	0	0	10	2	2
1/22	03.5°S	132.0°W	1800	98	07	18	02	0	1013.2	2	1.7	78.9	72.2	77.5	1	1	2	5	0	0	08	2	2
1/23	03.5°S	132.0°W	0000	98	07	10	03	0	1010.2	7	1.5	79.5	73.3	78.3	4	4	2	5	0	0	07	2	2
1/23	03.8°S	132.0°W	0600	98	09	15	01	0	1012.2	2	1.5	77.6	72.4	77.6	2	2	2	5	0	0	09	2	2
1/23	04.9°S	132.0°W	1800	98	09	14	03	0	1013.5	1	1.5	79.5	73.0	77.6	4	4	2	5	0	0	09	2	3
1/24	04.7°S	132.1°W	0000	98	09	11	03	1	1010.2	6	2.5	78.2	73.2	78.6	4	4	2	4	0	0	09	2	2
1/24	05.5°S	132.0°W	0600	98	08	17	00	1	1012.5	1	1.7	78.5	72.0	77.8	0	0	0	9	0	0	08	2	3
1/24	06.5°S	132.0°W	1800	98	09	17	03	1	1014.6	0	1.4	79.5	73.7	78.1	5	5	2	5	0	0	09	2	2
1/25	06.4°S	132.1°W	0000	98	10	16	02	2	1010.2	7	1.7	81.0	74.0	79.1	4	4	2	5	0	0	10	2	3
1/25	07.1°S	132.0°W	0600	98	11	15	01	1	1013.9	2	1.7	78.9	74.0	78.9	2	2	2	5	0	0	12	2	2
1/25	07.8°S	132.0°W	1800	98	12	15	01	1	1014.9	1	1.7	79.0	72.6	78.8	1	1	2	5	0	0	12	2	3
1/26	07.9°S	131.9°W	0000	98	11	14	02	1	1010.5	6	2.5	82.1	75.1	79.6	4	4	2	5	0	0	11	2	3
1/26	08.6°S	131.9°W	0600	98	12	15	01	1	1013.2	1	1.7	79.1	74.0	79.5	1	1	2	5	0	0	12	2	3
1/26	09.5°S	132.0°W	1800	98	07	16	02	0	1013.9	0	0.9	80.1	74.2	80.1	3	3	2	5	0	0	07	2	2
1/27	09.7°S	131.9°W	0000	98	05	09	02	0	1009.5	7	3.4	80.3	74.3	80.9	2	2	2	5	0	0	06	2	2
1/27	10.2°S	131.8°W	0600	98	09	12	02	0	1011.9	1	2.0	79.4	73.7	80.1	2	2	2	5	0	0	09	2	2
1/27	11.0°S	132.1°W	1800	98	08	09	03	0	1013.2	1	1.7	80.9	76.1	80.8	4	4	2	5	0	0	10	2	2
1/28	11.0°S	132.0°W	0000	98	07	08	03	0	1010.2	6	1.7	80.2	73.1	82.0	4	3	2	5	6	0	07	2	2
1/28	11.7°S	132.0°W	0600	98	09	08	01	6	1012.9	2	2.0	79.4	73.0	81.2	2	2	4	5	0	0	09	2	2
1/28	12.5°S	132.0°W	1800	98	06	12	03	1	1013.9	2	1.4	82.3	76.0	81.7	6	6	2	5	0	0	06	2	2
1/29	12.5°S	132.0°W	0000	98	06	09	01	1	1011.2	7	2.5	82.8	76.3	82.4	3	2	2	5	6	0	06	2	2
1/29	13.1°S	131.9°W	0600	98	09	09	02	0	1013.9	X	XX	80.5	75.0	81.6	2	2	X	X	X	X	09	2	2
1/29	14.1°S	132.0°W	1800	98	09	06	15	0	1013.9	1	1.2	82.0	76.5	81.8	3	2	2	5	2	0	09	2	1
1/30	14.1°S	132.0°W	0000	98	09	10	03	1	1010.5	6	1.7	82.1	77.2	82.6	6	4	2	5	2	0	09	2	2
1/30	13.9°S	132.3°W	0600	98	09	10	13	2	1013.9	1	1.5	82.0	78.0	82.0	4	1	2	5	2	0	09	2	2
1/30	13.5°S	133.1°W	1200	98	08	11	13	2	1010.2	8	2.5	81.6	78.9	81.5	4	2	2	5	2	0	08	2	2
1/30	13.1°S	133.9°W	1800	98	07	12	03	2	1012.9	1	1.7	84.0	77.5	82.1	6	2	2	5	1	0	07	2	2

Table 8.--Weather observations (USWB 1210-F), John R. Manning cruise 34 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
1/31	12.7°S	134.6°W	0000	98	06	10	15	2	1010.2	6	1.5	86.5	78.8	83.0	7	3	2	5	1	0	06	2	1
1/31	12.5°S	135.3°W	0600	98	02	10	13	6	1012.2	5	0.5	79.0	71.0	81.6	8	X	2	X	2	X	06	2	2
1/31	12.1°S	136.0°W	1200	98	06	14	01	2	1010.2	6	3.1	79.6	75.1	81.6	5	2	2	5	2	X	06	2	2
1/31	11.8°S	136.8°W	1800	98	04	12	15	2	1013.2	1	1.7	82.0	77.4	81.6	8	4	2	5	2	X	04	2	2
2/1	11.4°S	137.6°W	0000	98	06	16	03	2	1010.2	6	2.2	81.8	75.7	81.7	5	2	2	5	6	0	06	2	2
2/1	11.0°S	138.1°W	0600	98	08	12	01	1	1012.2	2	1.4	81.2	74.6	81.4	2	2	2	5	0	0	07	2	2
2/1	10.9°S	138.5°W	1800	98	08	11	01	0	1011.5	1	0.9	82.0	74.9	81.3	2	2	2	5	0	0	08	2	2
2/2	10.8°S	138.5°W	0000	98	08	10	02	0	1008.5	7	2.5	81.6	73.9	81.8	2	2	2	5	0	0	08	2	2
2/2	10.3°S	138.5°W	0600	98	08	07	01	1	1010.5	1	1.0	80.5	77.0	81.5	1	1	1	5	0	0	08	2	2
2/2	09.5°S	138.6°W	1800	98	06	08	03	0	1010.8	1	1.7	82.0	74.0	81.4	3	3	2	5	1	0	06	2	2
2/3	09.5°S	138.5°W	0000	98	06	07	02	0	1008.1	7	2.5	81.1	75.2	82.7	3	3	2	5	0	0	06	2	1
2/3	09.1°S	138.4°W	0600	98	06	14	01	1	1009.5	1	1.7	80.5	74.5	81.0	0	0	0	9	0	0	06	2	1
2/3	08.5°S	138.5°W	1800	98	05	09	03	0	1010.5	1	1.7	80.5	74.2	81.0	3	3	2	5	6	0	05	2	2
2/4	08.5°S	138.5°W	0000	98	06	10	03	1	1007.1	7	2.0	79.8	75.0	81.6	7	3	2	5	4	0	06	2	2
2/4	08.0°S	138.4°W	0600	98	09	13	01	1	1009.1	2	1.7	80.5	74.9	80.5	3	2	2	5	5	X	08	2	2
2/4	07.5°S	138.6°W	1800	98	08	16	01	1	1010.5	1	1.0	81.0	74.5	80.2	2	1	2	5	4	0	08	2	2
2/5	07.6°S	138.5°W	0000	98	09	14	03	1	1007.5	6	2.2	79.6	74.9	80.5	6	3	2	4	9	0	09	2	3
2/5	07.6°S	139.0°W	0600	98	08	14	01	1	1010.2	2	1.7	80.5	75.3	80.3	2	2	2	5	0	0	08	2	3
2/5	07.5°S	139.6°W	1800	98	09	18	03	1	1010.5	1	1.5	81.5	75.0	80.7	4	4	2	5	0	0	09	2	4
2/6	07.6°S	139.5°W	0000	98	09	19	01	1	1007.8	7	2.0	81.9	75.6	81.0	3	3	2	5	0	0	09	2	4
2/6	08.1°S	139.4°W	0600	98	09	19	01	1	1009.8	1	1.7	80.3	76.0	80.6	2	2	2	5	0	0	09	2	4
2/6	08.5°S	139.5°W	1800	98	09	17	03	1	1009.8	4	0.0	81.0	76.0	80.7	6	6	2	5	0	0	09	2	4
2/7	08.5°S	139.5°W	0000	98	09	13	03	2	1007.1	7	1.7	81.5	76.4	81.2	5	5	2	5	0	0	09	2	4
2/7	09.0°S	139.4°W	0600	98	09	13	01	1	1008.5	2	0.9	81.0	77.0	81.2	3	3	2	5	0	0	09	2	3
2/7	09.5°S	139.6°W	1800	98	06	14	03	1	1009.1	2	1.7	81.6	75.8	81.4	5	5	2	5	0	0	06	2	3
2/8	09.5°S	139.6°W	0000	98	08	12	01	1	1006.8	7	1.9	82.6	75.8	81.7	2	1	2	5	6	0	07	2	2
2/8	10.0°S	139.5°W	0600	98	10	15	02	0	1008.5	1	1.7	81.2	76.5	81.5	1	1	2	5	0	0	10	2	2
2/8	10.4°S	139.6°W	1800	98	07	18	03	0	1009.5	1	1.2	82.0	75.3	81.5	3	3	2	5	0	0	09	2	2
2/9	10.4°S	139.5°W	0000	98	07	14	01	0	1006.4	7	2.0	81.8	76.0	81.9	1	1	2	5	0	0	07	2	2
2/9	10.0°S	139.9°W	0600	98	09	12	02	0	1008.8	2	1.4	82.0	77.5	81.6	1	1	2	5	1	0	09	2	2
2/9	09.3°S	140.6°W	1800	98	11	12	03	0	1008.5	2	1.4	81.4	75.0	81.2	2	2	2	5	0	0	09	2	3
2/10	08.4°S	140.6°W	1800	98	08	11	15	0	1010.2	2	2.0	81.4	74.8	80.9	3	3	3	4	0	0	08	2	2
2/11	08.5°S	140.5°W	0000	98	07	12	15	1	1007.5	7	2.0	82.0	75.0	81.5	6	4	3	4	6	0	07	2	2
2/11	08.9°S	140.8°W	0600	98	12	02	03	1	1009.8	2	2.4	81.2	75.1	81.4	4	2	2	5	1	0	12	2	1
2/11	09.5°S	141.4°W	1200	98	10	08	01	0	1007.8	6	1.9	80.6	74.7	81.4	1	1	2	5	0	0	10	2	1
2/11	10.1°S	141.9°W	1800	98	10	14	15	1	1010.8	2	1.7	81.5	75.1	81.9	6	3	2	4	5	0	10	3	1
2/12	10.6°S	142.6°W	0000	98	03	07	01	1	1007.5	7	1.5	83.0	75.3	83.2	2	2	5	2	0	0	04	2	1
2/12	11.2°S	143.3°W	0600	98	17	05	03	1	1009.5	2	2.0	79.5	72.5	82.7	4	2	5	2	4	0	XX	X	X
2/12	11.7°S	143.9°W	1200	98	09	13	01	1	1007.8	6	1.7	81.5	73.5	82.3	2	2	2	4	0	0	09	2	2
2/12	12.3°S	144.4°W	1800	98	07	11	02	1	1010.2	1	2.0	83.0	74.3	83.0	2	2	5	2	0	0	08	2	2
2/13	12.9°S	145.0°W	0000	98	04	10	02	0	1007.8	7	1.7	84.0	76.0	84.1	2	2	2	5	0	0	04	2	2
2/13	13.6°S	145.6°W	0600	98	02	06	03	1	1010.2	2	1.9	83.1	74.6	83.5	6	6	8	4	0	0	04	2	1
2/13	14.2°S	146.3°W	1200	98	16	06	01	1	1010.2	7	2.0	81.3	74.6	83.0	2	2	8	5	0	0	16	2	1
2/13	14.9°S	146.8°W	1800	98	09	07	02	0	1011.9	2	1.7	83.6	75.2	83.4	1	1	2	5	0	0	03	3	1
2/14	15.6°S	147.3°W	0000	98	18	04	03	1	1009.1	7	1.7	83.2	75.5	87.4	6	6	8	4	0	0	18	4	1

Table 8.--Weather observations (USWB 1210-F), John R. Manning cruise 34 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
2/14	16.0°S	148.0°W	0600	98	18	04	01	1	1010.5	2	1.7	82.0	75.5	85.0	3	1	2	5	4	0	18	4	1
2/14	16.7°S	148.6°W	1200	98	08	12	03	1	1008.1	7	1.7	81.4	76.1	83.1	7	3	8	4	X	X	08	2	2
2/19	16.6°S	150.1°W	1800	98	07	08	02	X	1011.5	1	1.0	83.1	75.2	83.7	3	1	2	5	1	0	08	2	1
2/20	16.6°S	150.0°W	0000	98	08	11	14	2	1009.8	7	2.2	82.8	77.2	84.1	6	2	2	5	6	0	08	2	2
2/20	15.9°S	149.8°W	0600	98	03	12	01	1	1010.5	2	1.4	83.5	78.0	83.7	2	2	2	5	0	0	03	2	2
2/20	15.1°S	149.8°W	1800	98	04	07	03	1	1011.9	2	1.2	83.5	76.3	83.5	4	3	2	5	0	8	04	2	2
2/21	15.1°S	149.7°W	0000	98	04	04	02	1	1009.5	7	1.7	82.1	76.1	84.8	4	3	2	5	1	0	04	2	2
2/21	14.3°S	149.5°W	0600	98	06	04	01	8	1010.8	1	2.0	81.8	75.4	83.7	3	3	2	5	X	X	06	2	2
2/21	13.8°S	149.4°W	1200	98	05	07	01	1	1009.8	7	1.5	80.8	75.3	83.2	2	2	2	5	0	0	06	2	2
2/21	13.4°S	149.5°W	1800	98	01	14	16	8	1012.5	2	1.5	81.1	75.5	83.3	6	3	3	4	6	0	01	2	2
2/22	13.4°S	149.5°W	0000	98	34	03	01	1	1010.2	7	2.5	84.0	77.0	85.1	2	2	2	5	0	0	04	2	2
2/22	12.9°S	149.3°W	0600	98	05	14	02	1	1011.2	2	1.9	82.9	76.1	83.1	3	3	8	5	0	0	05	2	2
2/22	12.2°S	149.1°W	1200	98	06	13	03	1	1010.2	7	1.0	82.0	75.5	82.9	5	5	8	4	0	0	06	2	2
2/22	12.0°S	149.3°W	1800	98	07	14	02	2	1012.5	2	1.7	83.4	76.5	83.0	5	5	2	5	0	0	07	2	2
2/23	12.2°S	149.2°W	0000	98	07	14	02	2	1010.5	7	1.7	83.2	77.2	83.5	4	4	2	5	0	0	07	2	3
2/23	11.7°S	149.1°W	0600	98	07	16	01	1	1011.5	2	1.9	83.0	78.0	83.0	2	2	8	5	0	0	07	2	3
2/23	11.3°S	149.0°W	1200	98	08	17	02	0	1010.5	6	1.9	82.8	77.2	82.6	2	2	1	5	0	0	07	2	3
2/23	10.4°S	148.9°W	1800	98	11	16	03	0	1012.9	3	2.0	83.0	77.5	82.8	3	3	2	5	0	0	10	2	3
2/24	10.7°S	148.9°W	0000	98	08	11	01	0	1010.5	7	2.7	84.0	78.0	83.5	2	1	2	5	2	0	08	2	3
2/24	10.2°S	148.8°W	0600	98	07	17	02	0	1012.5	1	1.7	83.5	76.5	83.0	2	2	2	5	0	0	07	2	3
2/24	09.5°S	148.6°W	1200	98	10	15	02	0	1011.5	7	1.7	81.2	74.4	82.2	2	2	2	5	0	0	10	2	3
2/24	09.1°S	148.7°W	1800	98	09	12	02	0	1013.9	2	1.7	83.1	76.5	81.7	2	2	2	5	0	0	09	2	2
2/25	09.1°S	148.6°W	0000	98	08	12	02	0	1011.5	8	2.5	83.0	77.0	82.7	2	2	2	5	0	0	08	2	2
2/25	08.5°S	148.4°W	0600	98	09	14	02	0	1012.2	1	1.7	81.8	76.6	82.0	2	2	2	5	0	0	09	2	2
2/25	07.8°S	148.3°W	1200	98	09	12	02	0	1010.8	2	1.4	81.0	76.2	81.5	2	2	2	5	0	0	09	2	2
2/25	07.3°S	148.5°W	1800	98	08	12	03	1	1013.2	2	1.7	83.1	76.7	81.0	5	4	2	5	3	0	08	2	3
2/26	07.4°S	148.4°W	0000	98	07	09	01	1	1010.5	7	2.0	81.7	75.3	81.5	2	1	2	5	4	0	07	2	2
2/26	06.9°S	148.3°W	0600	98	07	12	01	0	1011.5	1	1.7	80.0	75.0	80.0	1	1	1	5	0	0	06	2	2
2/26	06.2°S	148.2°W	1200	98	07	08	02	0	1010.5	6	1.0	79.9	74.8	80.4	1	1	8	5	0	0	07	2	2
2/26	05.9°S	148.2°W	1800	98	09	12	02	0	1012.9	2	2.4	80.4	75.0	80.5	2	2	2	5	2	4	08	2	2
2/27	05.9°S	148.3°W	0000	98	06	07	03	1	1010.2	7	2.5	81.0	75.5	81.5	4	4	2	5	1	0	06	2	2
2/27	05.5°S	148.1°W	0600	98	08	07	01	1	1011.9	2	2.2	79.9	74.5	81.1	2	2	2	5	0	0	08	2	2
2/27	05.0°S	148.0°W	1200	98	08	10	02	0	1010.8	6	1.7	79.8	75.0	79.8	3	3	2	5	0	0	08	2	2
2/27	04.3°S	148.0°W	1800	98	09	11	02	0	1012.9	2	1.7	79.9	74.5	79.6	2	2	2	5	0	0	09	2	2
2/28	04.4°S	148.0°W	0000	98	08	09	02	0	1009.1	6	1.7	79.5	74.0	80.5	2	2	2	5	0	0	08	2	2
2/28	03.9°S	148.0°W	0600	98	06	09	02	0	1010.5	2	2.2	80.0	74.2	79.9	2	2	2	5	0	0	06	2	2
2/28	03.2°S	147.9°W	1200	98	10	11	02	0	1009.8	7	2.0	78.5	74.0	79.7	1	1	2	5	0	0	09	2	2
2/28	02.8°S	148.2°W	1800	98	09	12	03	1	1012.5	2	1.9	79.3	75.0	79.6	5	5	2	5	0	0	09	2	2
3/1	02.9°S	148.2°W	0000	98	09	10	03	1	1009.1	7	2.5	80.0	75.1	80.3	6	5	2	5	1	0	09	2	2
3/1	02.5°S	148.1°W	0600	98	12	12	01	1	1011.2	2	1.9	79.9	75.2	80.0	2	2	2	5	0	0	12	2	2
3/1	01.9°S	147.9°W	1200	98	08	08	02	0	1010.5	6	1.4	79.0	75.0	79.7	2	2	2	5	0	0	10	2	2
3/1	01.5°S	147.9°W	1800	98	08	09	01	0	1012.2	2	1.5	80.1	75.1	79.3	2	1	2	5	1	0	09	2	2
3/2	01.5°S	147.8°W	0000	98	08	08	03	0	1009.5	7	2.4	81.0	75.5	80.0	3	3	2	5	0	0	08	2	2
3/2	01.0°S	147.7°W	0600	98	08	08	01	0	1012.2	2	2.2	79.5	75.0	79.3	2	2	2	5	0	0	08	2	2
3/2	00.3°S	147.7°W	1200	98	08	09	02	0	1010.8	7	1.7	77.8	74.1	78.7	1	1	1	5	0	0	08	2	2

Table 8.--Weather observations (USWB 1210-F), John R. Manning cruise 34 (cont'd)

Date, 1957	Latitude	Longitude	Time, GMT	Visibility	Wind		Weather		Pressure			Temperature			Clouds						Waves		
					Direction, °T.	Speed, kt.	Present	Past	Bar. corr., mb.	Characteristic	Amt. change	Dry bulb, °F.	Wet bulb, °F.	Sea water, °F.	Total amount	Amount low	Type low	Height low	Type middle	Type high	Direction	Period	Height
3/2	00.1°N	148.0°W	1800	98	07	09	03	0	1013.2	2	1.9	79.2	74.8	79.0	3	3	2	5	0	0	07	2	1
3/3	00.1°N	147.9°W	0000	98	07	12	03	1	1009.8	7	2.5	78.8	74.5	79.9	5	5	2	5	0	0	07	2	1
3/3	00.5°N	147.9°W	0600	98	07	10	01	1	1010.5	1	1.4	79.0	75.5	79.2	2	2	2	5	0	0	07	2	1
3/3	01.0°N	148.0°W	1200	98	07	11	03	0	1010.2	8	1.2	78.5	74.8	79.5	3	3	2	5	0	0	07	2	1
3/3	01.1°N	148.0°W	1800	98	08	10	02	0	1012.5	2	1.7	80.4	75.1	79.6	2	2	2	5	0	0	08	2	2
3/4	01.1°N	148.0°W	0000	98	10	11	03	1	1009.5	7	2.5	79.5	75.0	80.8	5	5	2	5	0	0	10	2	3
3/4	01.5°N	147.9°W	0600	98	10	10	01	1	1010.2	2	1.7	79.0	75.0	80.0	3	3	2	5	0	0	10	2	2
3/4	02.0°N	147.9°W	1200	98	09	14	50	1	1009.8	6	1.7	79.2	75.6	79.9	3	3	3	4	0	0	09	2	2
3/4	02.0°N	148.0°W	1800	98	09	14	01	0	1010.8	2	1.7	80.2	75.2	79.8	3	3	2	5	0	1	09	2	2
3/5	01.9°N	148.0°W	0000	98	07	12	03	1	1008.1	7	2.7	81.8	76.1	80.9	5	5	2	5	0	0	07	2	3
3/5	02.4°N	148.0°W	0600	98	08	14	01	1	1009.1	2	1.7	79.8	75.3	80.3	2	2	1	5	0	0	08	2	3
3/5	03.0°N	147.9°W	1200	98	08	12	02	0	1008.8	7	1.9	79.2	76.0	79.9	3	3	2	5	0	0	08	2	3
3/5	03.0°N	148.0°W	1800	98	08	13	01	1	1010.2	3	1.5	80.3	76.0	80.0	4	4	2	5	0	0	08	2	3
3/6	03.0°N	148.1°W	0000	98	08	13	01	0	1007.5	7	2.0	80.0	75.4	80.4	3	3	2	5	0	0	08	2	3
3/6	03.4°N	148.5°W	0600	98	08	16	02	0	1009.5	2	2.4	80.5	76.0	80.1	1	1	1	5	0	0	08	2	2
3/6	04.2°N	148.8°W	1200	98	08	16	02	0	1009.5	7	1.7	80.1	76.0	80.3	1	1	1	5	0	0	08	2	2
3/6	04.9°N	149.1°W	1800	98	08	20	03	1	1011.5	1	1.0	81.3	76.0	80.4	5	5	8	5	0	0	04	2	3
3/7	05.5°N	149.4°W	0000	98	05	20	02	2	1008.5	7	1.9	82.2	76.7	81.0	5	5	8	5	0	0	05	2	3
3/7	06.1°N	149.7°W	0600	98	07	20	01	1	1010.5	2	1.7	81.8	76.8	81.2	2	2	8	5	0	0	05	2	3
3/7	06.6°N	149.9°W	1200	98	07	20	03	0	1010.2	8	1.5	80.2	76.0	80.8	3	3	2	5	0	0	06	2	3
3/7	07.3°N	150.3°W	1800	97	10	15	21	6	1012.5	2	2.0	77.0	75.0	80.9	8	8	7	4	X	X	07	2	3
3/8	07.9°N	150.6°W	0000	98	06	20	01	2	1010.2	7	2.4	79.5	75.0	80.5	6	6	7	4	0	0	05	2	4
3/8	08.4°N	151.0°W	0600	98	06	22	01	2	1011.2	3	1.9	79.0	75.3	79.8	4	4	2	5	0	0	06	2	4
3/8	09.1°N	151.4°W	1200	98	07	21	02	1	1011.2	7	1.7	78.1	74.6	79.3	3	3	8	5	0	0	07	2	4
3/8	09.8°N	151.8°W	1800	98	08	20	03	1	1013.2	1	1.7	79.0	74.3	79.6	6	6	8	5	0	0	08	2	4
3/9	10.5°N	152.3°W	0000	98	05	20	03	2	1012.2	6	1.7	78.4	73.8	79.3	6	4	2	5	4	0	05	2	4
3/9	11.1°N	152.6°W	0600	98	08	18	02	2	1012.5	2	2.2	79.0	74.1	79.0	6	6	2	5	0	0	08	2	4
3/9	11.7°N	153.0°W	1200	98	07	21	01	2	1011.5	7	1.4	77.0	74.0	78.0	4	4	2	5	X	X	07	2	3
3/9	12.4°N	153.4°W	1800	98	08	19	03	6	1013.5	2	0.9	77.0	72.2	77.3	7	5	8	5	5	0	08	2	3
3/10	13.1°N	153.8°W	0000	98	06	24	02	2	1012.2	7	2.2	76.1	72.4	77.0	6	3	2	5	3	0	05	3	4
3/10	13.6°N	154.0°W	0600	98	06	27	02	2	1013.5	2	2.0	75.2	71.0	76.1	6	6	2	5	X	X	06	3	4
3/10	14.2°N	154.3°W	1200	98	08	21	02	2	1013.9	4	0.0	73.5	69.2	74.8	6	6	2	5	X	X	08	3	4
3/10	14.9°N	154.7°W	1800	98	05	18	02	2	1015.6	1	1.7	75.2	70.9	74.9	6	4	2	5	4	0	06	3	4
3/11	15.5°N	155.1°W	0000	98	06	20	02	2	1014.9	7	1.7	76.0	70.0	75.2	8	4	8	5	2	X	04	3	4
3/11	16.2°N	155.5°W	0600	98	06	20	02	2	1015.6	2	2.5	73.5	68.5	74.5	7	3	8	5	3	X	04	3	3
3/11	16.8°N	155.8°W	1200	97	06	19	03	2	1015.2	7	1.4	73.2	67.0	74.0	8	8	8	5	X	X	05	3	3
3/11	17.4°N	156.1°W	1800	98	07	16	02	2	1017.3	2	2.7	72.8	67.0	73.4	8	8	8	5	X	X	05	3	3
3/12	18.4°N	156.5°W	0000	98	08	16	01	1	1016.6	7	1.9	73.6	68.0	73.6	3	2	2	5	8	0	08	3	3
3/12	19.1°N	156.9°W	0600	98	13	13	02	0	1017.3	3	1.2	73.4	67.7	73.8	3	3	8	5	0	0	07	2	3
3/12	19.9°N	157.2°W	1200	97	23	09	50	1	1016.9	6	0.5	70.4	67.8	74.0	8	8	7	4	X	X	08	2	2
3/12	20.7°N	157.6°W	1800	98	06	14	01	2	1018.0	1	1.4	73.6	67.0	74.4	5	5	8	5	0	0	03	2	2

Table 9.--Transparency, water color, and related observations, Hugh M. Smith cruise 38

Date, 1957	Noon position[1]		Secchi disc, meters	Water color, (Forel)	Sea[2]	Wind[3]	Percent sky cover
	Latitude	Longitude					
1/23	00°03'S	122°53'W	22.8	6	2	15-11	30
1/24	00°24'S	119°50'W	23.8	2	2	13-22	20
1/25	00°15'S	116°49'W	16.5	3	2	13-10	50
1/26	00°08'N	113°27'W	23.8	3	2	14-14	10
1/27	00°12'S	110°12'W	21.9	3	2	10-11	10
1/28	03°24'S	110°01'W	29.3	1	3	15-16	20
1/29	06°58'S	110°01'W	29.3	1	3	12-14	20
1/30	10°10'S	109°59'W	23.8	2	2	10-10	10
1/31	13°06'S	110°03'W	23.8	2	1	14-03	10
2/1	13°32'S	110°12'W	27.4	-	1	08-08	70
2/2	13°38'S	110°28'W	27.4	1	2	07-12	30
2/3	13°39'S	110°39'W	29.3	1	2	08-05	20
2/4	13°38'S	111°02'W	27.4	2	2	09-10	20
2/5	13°45'S	111°15'W	23.8	1	2	07-10	20
2/6	13°48'S	111°48'W	25.6	3	2	09-11	40
2/7	14°00'S	112°01'W	20.1	2	3	09-18	70
2/9	14°10'S	112°32'W	27.4	1	3	09-17	20
2/10	14°13'S	112°45'W	27.4	1	3	07-16	30
2/11	14°15'S	112°58'W	29.3	2	3	07-10	30
2/16	14°18'S	114°28'W	31.1	2	3	08-12	10
3/18	00°42'S	144°58'W	23.8	1	2	10-12	30

[1] All observations taken at 1200 LT.

[2] Sea state coded according to H.O. Pub. No. 606-c, second edition, 1956.

[3] Wind direction and speed coded according to U. S. Weather Bureau, Circular M.

Table 10.--Transparency, water color, and related observations, Charles H. Gilbert cruise 32

Date, 1957	Time, LT	Position		Secchi disc, meters	Water color (Forel)	Sea [1/]	Wind [2/]	Percent sky cover
		Latitude	Longitude					
1/25	1330	09°28'S	140°00'W	32.0	2.5	3	05-16	60
1/26	1330	09°40'S	139°37'W	27.4	3.0	3	07-12	40
1/27	1330	10°24'S	138°45'W	16.5	2.0	3	05-10	80
1/28	1330	09°01'S	139°26'W	23.8	2.2	2	03-07	40
1/29	1335	08°16'S	139°30'W	34.7	2.0	4	07-13	40
1/30	1340	08°10'S	140°38'W	32.9	3.0	3	06-13	20
2/3	1340	09°50'S	140°18'W	31.1	3.0	2	06-11	30
2/13	1020	15°54'S	146°22'W	34.7	1.5	1	07-04	10
2/24	1345	09°48'S	139°23'W	20.1	2.0	2	07-05	60
2/25	1345	10°13'S	138°54'W	20.1	4.0	1	06-07	40
2/26	1415	09°40'S	138°46'W	31.1	1.5	1	33-04	10
2/28	1340	08°24'S	140°34'W	31.1	2.5	1	06-08	50
3/3	1420	09°00'S	140°08'W	23.8	2.5	3	31-07	100
3/4	1400	08°49'S	140°29'W	25.6	2.5	2	05-08	20
3/5	1340	08°46'S	140°22'W	27.4	3.0	3	06-15	50
3/6	1415	09°36'S	139°27'W	31.1	3.0	3	08-16	30
3/7	1350	09°16'S	139°45'W	31.1	3.0	2	05-11	20
3/8	1310	09°06'S	140°19'W	30.2	2.5	2	11-10	70

[1/] Sea state coded according to H.O. Pub. No. 606-c, second edition, 1956.

[2/] Wind direction and speed coded according to U. S. Weather Bureau, Circular M.

Table 11.--Carbon fixation, inorganic phosphate, and surface temperature observations, Hugh M. Smith cruise 38

Station	Date, 1957	Time, LT	Position		C^{14}, Mg.C/hr./m.^{3}	PO_4-P, µg at./L.	Surface temp., °F.
			Latitude	Longitude			
1	1/14	0940	15°46'N	151°26'W	0.090	0.32	-
2	1/15	0800	14°01'N	147°24'W	0.146	0.47	76.5
3	1/16	0900	12°07'N	144°22'W	0.121	-	-
4	1/17	0915	10°25'N	141°24'W	0.822	0.43	76.9
5	1/18	0915	08°45'N	138°26'W	0.276	-	79.0
6	1/19	0915	06°54'N	135°04'W	0.481	0.59	78.7
7	1/20	0915	04°43'N	132°07'W	0.264	0.52	79.1
8	1/21	1010	02°53'N	129°06'W	0.374	0.76	77.9
9	1/22	1020	00°45'N	126°05'W	0.388	0.88	76.5
10	1/23	1115	00°04'N	123°57'W	0.414	0.98	75.7
11	1/24	1215	00°24'N	119°50'W	0.353	0.74	-
12	1/25	1200	00°15'S	116°49'W	-	0.88	-
13	1/26	1200	00°08'N	113°27'W	0.421	1.01	-
14	1/27	1230	00°12'S	110°12'W	0.509	0.68	76.4
15	1/28	1205	03°24'S	110°01'W	0.278	0.99	-
16	1/29	1225	06°58'S	110°01'W	0.044	1.01	-
17	1/30	1200	10°10'S	109°59'W	0.129	-	-
18	1/31	1200	13°06'S	110°03'W	0.130	0.28 P	80.9
19	2/1	1245	13°32'S	110°12'W	0.078	0.52	79.5
20	2/3	1215	13°39'S	110°39'W	0.073	0.45	-
21	2/4	1220	13°38'S	111°02'W	0.095	0.52	79.9
22	2/5	1245	13°45'S	111°15'W	0.077	0.51	79.9
23	2/6	1230	13°48'S	111°48'W	0.084	0.52	80.1
24	2/7	1200	14°00'S	112°01'W	0.081	0.52	79.4
25	2/8	1200	14°06'S	112°17'W	0.104	0.77 P	-
26	2/9	1200	14°10'S	112°33'W	0.118	0.52	-
27	2/10	1200	14°13'S	112°46'W	0.094	0.29	-
28	2/11	1245	14°15'S	112°59'W	0.358	0.56	80.3
29	2/12	1215	14°17'S	113°12'W	0.093	0.59	-
30	2/15	1230	14°24'S	114°07'W	0.071	1.20	80.2
31	2/16	1230	14°18'S	114°28'W	0.088	2.69 P	-
32	2/18	1230	13°56'S	116°38'W	0.105	1.27	-
33	2/19	1200	13°36'S	118°21'W	0.209	0.85	-
34	2/25	1200	01°36'S	129°51'W	0.257	0.55	78.4
35	2/26	1145	04°59'S	130°03'W	0.080	0.54	-
36	2/27	1150	08°29'S	130°03'W	0.066	0.60	-
37	2/28	1115	11°48'S	129°58'W	0.079	0.46	-
38	2/28	1400	12°12'S	130°01'W	-	0.48	85.5
39	3/1	1200	15°22'S	129°53'W	0.072	0.33	-
40	3/2	1145	18°08'S	130°39'W	0.018	0.41	82.4
41	3/3	1200	17°44'S	134°01'W	0.135	0.22	82.7
42	3/4	1215	17°37'S	136°44'W	0.164	0.68 P	-
43	3/5	1135	17°44'S	139°52'W	0.048	0.14	82.4
44	3/6	1130	18°00'S	140°57'W	0.072	0.37	82.6
45	3/7	1130	18°05'S	144°13'W	0.094	0.18	82.8
46	3/8	1130	17°57'S	147°34'W	0.005	0.37	83.8
47	3/17	1100	06°25'S	145°01'W	0.334	-	-
48	3/18	1130	03°18'S	144°57'W	0.059	1.25	-
49	3/19	1100	00°45'S	144°58'W	0.209	0.71	81.0

P = Possible contamination of sample

Table 12.--Zooplankton station data and sample volumes, Hugh M. Smith cruise 38

Station	Date, 1957	Time, LT 1/	Position		Depth, m.	Volume, cc./1000 m.^{3} 2/
			Latitude	Longitude		
2	1/22	2000-2032	00°02'N	124°56'W	200	30.2
	1/22	2010-2024	"	"	60	84.3
	1/22	2042-2109	00°02'N	124°54'W	Surface	97.2
	1/22	2110-2136	"	"	Surface	105.4
4	1/23	1135-1155	00°04'N	122°57'W	60	39.2
5	1/23	2000-2030	00°13'N	121°46'W	200	42.5
	1/23	2010-2022	"	"	60	94.5
	1/23	2050-2118	00°12'N	121°44'W	Surface	51.3
	1/23	2119-2145	"	"	Surface	57.6
7	1/24	1135-1153	00°25'N	119°51'W	60	37.7
8	1/24	2005-2041	00°13'N	118°49'W	200	30.4
	1/24	2015-2031	"	"	60	113.9
	1/24	2050-2116	00°11'N	118°46'W	Surface	57.7
	1/24	2117-2143	"	"	Surface	61.4
10	1/25	1140-1200	00°14'S	116°50'W	60	38.3
11	1/25	2000-2044	00°08'S	115°32'W	200	36.0
	1/25	2014-2030	"	"	60	126.1
	1/25	2045-2110	00°06'S	115°30'W	Surface	80.2
	1/25	2111-2136	"	"	Surface	93.6
13	1/26	1140-1201	00°08'N	113°28'W	60	57.4
14	1/26	2005-2048	00°01'S	112°14'W	200	42.9
	1/26	2018-2035	"	"	59	135.3
	1/26	2050-2115	00°03'S	112°14'W	Surface	87.9
	1/26	2116-2143	"	"	Surface	94.1
15	1/27	1115-1129	00°12'S	110°13'W	60	53.2
16	1/27	2000-2037	01°23'S	110°06'W	200	39.3
	1/27	2010-2026	"	"	60	170.1
	1/27	2040-2109	01°23'S	110°04'W	Surface	147.6
	1/27	2110-2136	"	"	Surface	133.9
18	1/28	1135-1134	03°23'S	110°03'W	60	57.9
19	1/28	2015-2051	04°43'S	109°45'W	177	31.8
	1/28	2026-2041	"	"	53	73.2
	1/28	2055-2120	04°45'S	109°44'W	Surface	82.0
	1/28	2121-2146	"	"	Surface	100.6
21	1/29	1140-1200	06°58'S	110°02'W	60	55.3
23	1/29	2005-2047	07°53'S	110°04'W	169	33.6
	1/29	2015-2030	"	"	51	60.9
	1/29	2055-2121	07°55'S	110°02'W	Surface	39.5
	1/29	2122-2148	"	"	Surface	40.0
25	1/30	1135-1156	10°10'S	110°00'W	60	28.9
28	1/31	1130-1150	13°06'S	110°04'W	60	17.6
44	2/25	1105-1131	01°35'S	129°52'W	60	47.7
45	2/25	2000-2045	02°58'S	129°55'W	207	45.0
	2/25	2013-2030	"	"	62	103.0
	2/25	2100-2127	03°00'S	129°52'W	Surface	91.1
	2/25	2128-2153	"	"	Surface	93.2
46	2/26	1100-1121	04°59'S	130°07'W	60	44.7

1/ Stations 2-7 - +8 time zone
Stations 8-28 - +7 " "
Station 44 - +8 " "
Stations 45-65 - +9 " "

2/ All fish, jellies >2 cm. and organisms >5 cm. are not included.

Table 12.--Zooplankton station data and sample volumes, Hugh M. Smith cruise 38 (cont'd)

Station	Date, 1957	Time, LT [1]	Position		Depth, m.	Volume, cc./1000 m.^{3} [2]
			Latitude	Longitude		
47	2/26	2120-2206	06°32'S	130°04'W	181	21.5
	2/26	2134-2152	"	"	54	53.5
	2/26	2210-2234	06°33'S	130°01'W	Surface	71.2
	2/26	2235-2259	"	"	Surface	71.1
48	2/27	1100-1120	08°28'S	130°04'W	60	36.6
49	2/27	2115-2159	10°00'S	130°00'W	200	22.7
	2/27	2129-2146	"	"	60	48.7
	2/27	2200-2224	10°00'S	129°58'W	Surface	63.7
	2/27	2225-2249	"	"	Surface	60.3
50	2/28	1100-1118	11°48'S	129°58'W	56	28.2
51	2/28	2130-2214	13°27'S	130°01'W	200	14.8
	2/28	2144-2200	"	"	60	38.6
	2/28	2215-2239	13°30'S	130°00'W	Surface	66.2
	2/28	2240-2304	"	"	Surface	117.5
53	3/1	1130-1148	15°20'S	129°53'W	60	33.7
54	3/1	2000-2048	16°30'S	130°04'W	151	19.2
	3/1	2017-2034	"	"	45	54.3
	3/1	2050-2114	16°35'S	130°04'W	Surface	78.1
	3/1	2115-2140	"	"	Surface	99.3
56	3/2	1130-1146	18°09'S	130°39'W	60	7.3
57	3/2	2040-2119	18°03'S	131°53'W	177	11.1
	3/2	2052-2106	"	"	53	18.6
	3/2	2120-2144	18°01'S	131°54'W	Surface	23.0
	3/2	2145-2209	"	"	Surface	17.8
58	3/3	1130-1152	17°50'S	134°01'W	60	22.9
59	3/3	2000-2031	17°50'S	135°06'W	200	19.8
	3/3	2008-2022	"	"	60	46.1
	3/3	2035-2059	17°48'S	135°06'W	Surface	42.9
	3/3	2100-2124	"	"	Surface	41.6
61	3/4	1130-1150	17°39'S	136°41'W	60	20.2
63	3/5	1140-1201	17°44'S	139°52'W	60	6.8
64	3/5	2030-2102	17°56'S	140°28'W	200	20.4
	3/5	2040-2052	"	"	60	21.3
	3/5	2115-2138	17°55'S	140°25'W	Surface	17.7
	3/5	2139-2203	"	"	Surface	51.6
65	3/6	1130-1144	18°00'S	140°57'W	60	7.1
66	3/6	2030-2110	17°55'S	142°28'W	192	6.0
	3/6	2042-2059	"	"	58	13.1
	3/6	2115-2139	17°56'S	142°35'W	Surface	9.9
	3/6	2140-2204	"	"	Surface	11.3
67	3/7	1125-1141	18°04'S	144°13'W	60	13.0
68	3/7	2000-2039	18°03'S	145°30'W	200	6.6
	3/7	2011-2028	"	"	60	12.5
	3/7	2040-2104	18°02'S	145°31'W	Surface	9.1
	3/7	2105-2129	"	"	Surface	12.9
70	3/8	1100-1118	17°57'S	147°34'W	60	4.3
73	3/15	1100-1126	12°30'S	145°00'W	60	28.0

[1] Stations 45-65 - +9 time zone
Stations 66-87 - +10 " "

[2] All fish, jellies >2 cm. and organisms >5 cm. are not included.

Table 12.--Zooplankton station data and sample volumes, Hugh M. Smith cruise 38 (cont'd)

Station	Date, 1957	Time, LT[1]	Position		Depth, m.	Volume, cc./1000 m.^{3} [2]
			Latitude	Longitude		
75	3/15	2020-2101	11°18'S	145°02'W	200	22.8
	3/15	2031-2050	"	"	60	100.6
	3/15	2105-2129	11°18'S	144°59'W	Surface	29.2
	3/15	2130-2154	"	"	Surface	65.9
77	3/16	1100-1123	09°28'S	145°10'W	61	47.6
79	3/16	2020-2102	08°12'S	145°12'W	162	29.9
	3/16	2034-2051	"	"	49	85.9
	3/16	2103-2128	08°09'S	145°12'W	Surface	47.9
	3/16	2129-2153	"	"	Surface	40.4
81	3/17	1100-1124	06°25'S	145°01'W	60	29.6
82	3/17	2100-2146	05°00'S	145°00'W	200	23.8
	3/17	2114-2132	"	"	60	55.6
	3/17	2147-2211	05°01'S	144°57'W	Surface	31.5
	3/17	2212-2236	"	"	Surface	38.4
84	3/18	1100-1130	03°19'S	144°59'W	60	29.9
85	3/18	2020-2107	02°04'S	144°56'W	185	27.9
	3/18	2035-2055	"	"	55	79.0
	3/18	2108-2133	02°06'S	144°54'W	Surface	43.0
	3/18	2134-2157	"	"	Surface	37.9
87	3/19	1100-1128	00°45'S	144°58'W	60	54.0

[1] Stations 66-87 - +10 time zone

[2] All fish, jellies >2 cm. and organisms >5 cm. are not included.

Table 13.--Zooplankton station data and sample volumes, Charles H. Gilbert cruise 32

Station	Date, 1957	Time, LT	Position		Depth, m.	Volume, cc./1000 m.^{3} [1]
			Latitude	Longitude		
53	2/19	1937-2007	14°57'S	146°20'W	Surface	19.1
54	2/20	0347-0416	14°18'S	145°32'W	Surface	12.2
56	2/21	0346-0416	12°05'S	143°06'W	Surface	25.7
57	2/21	1933-2003	10°39'S	141°33'W	Surface	35.5
58	2/22	0345-0415	09°56'S	141°03'W	Surface	47.8
66	2/27	1936-2006	09°22'S	139°37'W	Surface	16.1
71	3/2	2121-2151	08°57'S	139°54'W	Surface	117.8

[1] All fish, jellies >2 cm. and organisms >5 cm. are not included.

Table 14. --Common and scientific names of fish caught

Yellowfin tuna	Neothunnus macropterus (Temminck and Schlegel)
Bigeye tuna	Parathunnus sibi (Temminck and Schlegel)
Albacore	Germo alalunga (Bonnaterre)
Skipjack	Katsuwonus pelamis (Linnaeus)
Little tuna	Euthynnus yaito Kishinouye
Dogtooth tuna	Gymnosarda nuda (Günther)
Dolphin	Coryphaena hippurus Linnaeus
Shortnosed spearfish	Tetrapturus angustirostris Tanaka
White marlin	Istiompax marlina (Jordan and Hill)
Black marlin	Makaira ampla (Poey)
Striped marlin	Makaira audax (Philippi)
Wahoo	Acanthocybium solandri (Cuvier and Valenciennes)
Whitetip shark	Pterolamiops longimanus (Poey)
Silky shark	Eulamia floridanus (Bigelow, Schroeder, and Springer)
Great blue shark	Prionace glauca (Linnaeus)
Bigeye thresher shark	Alopias superciliosus (Lowe)
Bonito shark	Isurus glaucus Müller and Henle
Hammerhead shark	Sphyrna lewini (Griffith)
Lancet fish	Alepisaurus sp.
Puffer	Lagocephalus lagocephalus (Linnaeus)
Marquesan sardine	Harengula vittata (Cuvier and Valenciennes)
Goatfish	Upeneus parvus Poey
Red snapper	Lutjanus bohar (Forskål)
Green snapper	Aprion virescens Cuvier and Valenciennes
Jack	Caranx ignobilis (Forskål)
Jack	Caranx lugubris Poey
Jack	Caranx melampygus Cuvier and Valenciennes
Barracuda	Sphyraena nigripinnis Temminck and Schlegel

Table 15. --Surface troll catch and related data, Hugh M. Smith cruise 38

Date, 1957	Time, LT	Position		Species	Number	Average length, cm.
		Latitude	Longitude			
1/16	1730	11°30'N	143°19'W	Dolphin	1	94.0
1/17	1645	09°53'N	140°26'W	Dolphin	1	102.3
1/18	0920	08°43'N	138°23'W	Dolphin	2	101.8
1/18	1135	08°33'N	138°07'W	Dolphin	2	86.6
1/31	1450	13°22'S	110°02'W	Skipjack	1	74.8
2/23	1100	05°32'S	128°19'W	Skipjack	1	-
3/20	1635	02°37'N	145°31'W	Yellowfin	1	43.0
3/22	1230	08°23'N	149°21'W	Wahoo	2	-
3/24	1300	14°45'N	151°42'W	Wahoo	2	-
3/26	0930	20°48'N	157°43'W	Dolphin	1	-

Table 16.--Surface troll catch and related data, Charles H. Gilbert cruise 32

Date, 1957	Time, LT	Position		Species	Number [1]	Average length, cm.
		Latitude	Longitude			
1/16	1200	11°31'N	151°31'W	Dolphin	1	95.7
1/16	1740	10°48'N	151°09'W	Dolphin	1	98.5
1/18	1630	05°28'N	147°35'W	Skipjack	2	70.5
1/21	1015	02°21'S	143°04'W	Skipjack	1	75.0
1/25	0849	09°23'S	140°09'W	Wahoo	2	158.4
1/28	0748	09°27'S	138°53'W	Yellowfin	4	115.5
1/28	0900	09°24'S	138°56'W	Wahoo	1	149.4
1/28	1313	09°03'S	139°23'W	Wahoo	1	126.2
1/29	0515	08°57'S	139°30'W	Yellowfin	5	103.2
1/30	0513	07°53'S	139°59'W	Wahoo	1	132.0
1/30	0514	07°53'S	139°59'W	Little tuna	1	-
1/30	0515	07°53'S	139°59'W	Yellowfin	1	-
1/30	1040	07°53'S	140°05'W	Little tuna	1	74.3
1/30	1115	07°56'S	140°40'W	Little tuna	1	48.0
1/31	1205	08°54'S	140°15'W	Wahoo	1	159.4
2/2	0520	08°58'S	140°06'W	Yellowfin	1	96.9
2/3	0650	09°27'S	140°05'W	Wahoo	1	135.8
2/4	0655	09°18'S	140°01'W	Wahoo	3	131.6
2/5	0952	08°47'S	140°00'W	Yellowfin	2	97.3
2/5	1230	08°46'S	140°11'W	Yellowfin	2	114.4
2/13	1400	16°08'S	146°55'W	Skipjack	4	57.4
2/13	1410	16°08'S	146°55'W	Yellowfin	3	54.1
2/23	0535	09°00'S	140°05'W	Yellowfin	4	69.8
2/24	0743	09°32'S	139°54'W	Skipjack	1	75.3
2/26	0515	10°33'S	138°40'W	Wahoo	2	137.2
2/28	0800	08°56'S	140°13'W	Yellowfin	1	106.8
2/28	1740	07°59'S	140°43'W	Yellowfin	1	86.7
3/1	0530	07°54'S	140°39'W	Yellowfin	2	106.3
3/1	0530	07°54'S	140°39'W	Little tuna	5	59.4
3/1	0940	07°49'S	140°19'W	Wahoo	1	136.3
3/1	0945	07°49'S	140°19'W	Doogtooth tuna	1	116.7
3/1	0948	07°49'S	140°19'W	Red snapper	2	64.4
3/1	0953	07°50'S	140°19'W	Little tuna	1	62.1
3/1	0955	07°50'S	140°19'W	Jack	2	76.0
3/1	0955	07°50'S	140°19'W	Green snapper	2	73.6
3/3	0705	08°49'S	140°01'W	Wahoo	3	133.9
3/7	1430	09°11'S	139°50'W	Skipjack	1	75.0
3/13	0555	06°33'S	141°29'W	Dolphin	2	31.2
3/16	0920	03°01'N	146°46'W	Skipjack	1	43.0
3/17	1120	06°26'N	148°19'W	Skipjack	1	46.4
3/19	0730	11°23'N	151°54'W	Dolphin	1	100.8
3/21	1350	18°04'N	155°48'W	Dolphin	1	104.7

[1] Fish of the same species caught within a 1-hour interval were combined in a single number.

Table 17.--Surface troll catch and related data, John R. Manning cruise 34

Date, 1957	Time, LT	Position		Species	Number[1/]	Average length, cm.
		Latitude	Longitude			
1/5	1700	19°23'N	156°02'W	Dolphin	1	97.1
1/9	1530	14°31'N	148°17'W	Dolphin	1	70.1
1/9	1745	14°24'N	148°03'W	Dolphin	1	95.3
1/11	1145	12°17'N	144°14'W	Dolphin	3	92.6
1/12	1725	10°25'N	141°14'W	Dolphin	1	80.9
1/15	1115	05°43'N	134°17'W	Yellowfin	2	38.6
1/30	1700	12°38'S	134°57'W	Skipjack	1	74.6
1/31	1430	11°18'S	137°36'W	Skipjack	1	75.7
2/2	1745	09°23'S	138°28'W	Skipjack	1	50.5
2/5	0735	07°31'S	139°36'W	Skipjack	1	79.5
2/10	1630	08°34'S	140°32'W	Skipjack	1	49.0
2/11	0830	10°08'S	142°02'W	Bigeye	2	50.6
3/2	1810	00°12'N	147°46'W	Skipjack	1	73.6
3/5	1530	02°57'N	148°03'W	Skipjack	1	72.0
3/7	0605	07°02'N	140°10'W	Wahoo	1	110.3
3/8	1730	10°51'N	152°26'W	Dolphin	1	87.4
3/9	0715	12°20'N	153°19'W	Dolphin	2	93.3
3/9	1145	12°50'N	153°37'W	Dolphin	1	98.7
3/11	0640	17°28'N	156°04'W	Wahoo	1	120.4
3/11	0645	17°28'N	156°04'W	Dolphin	1	74.4

[1/] Fish of the same species caught within a 1-hour interval were combined in a single number.

Table 18.--Longline station data and catch per 100 hooks, John R. Manning cruise 34

Station	Date, 1957	Noon position		Number of baskets	Number of hooks	Catch per 100 hooks			
		Latitude	Longitude			YF	BE	ALB	SJ
1	1/16	04°29'N	132°17'W	60	651	0.2	0.2	-	-
2	1/17	03°33'N	132°06'W	60	638	1.6	0.6	-	-
3	1/19	01°34'N	132°09'W	60	653	0.3	0.2	-	-
4	1/20	00°07'S	132°19'W	60	639	0.5	0.3	-	-
5	1/21	01°54'S	132°07'W	60	648	0.6	0.2	-	0.2
6	1/22	03°29'S	132°04'W	60	639	4.1	2.7	-	0.2
7	1/23	04°46'S	132°09'W	60	652	0.2	-	-	0.2
8	1/24	06°22'S	132°15'W	60	641	1.4	0.9	-	0.5
9	1/25	07°49'S	132°02'W	60	653	1.2	0.3	-	0.2
10	1/26	09°37'S	132°03'W	60	641	0.5	0.6	-	0.2
11	1/27	10°58'S	132°03'W	60	651	0.9	-	0.2	0.2
12	1/28	12°29'S	132°07'W	60	639	0.9	-	0.2	-
13	1/29	14°02'S	132°03'W	58	632	0.6	0.2	0.5	0.2
14	2/1	10°47'S	138°38'W	60	640	1.2	0.3	-	0.2
15	2/2	09°31'S	138°39'W	60	646	3.9	-	-	-
16	2/3	08°33'S	138°34'W	60	641	1.6	0.2	0.2	0.5
17	2/4	07°35'S	138°38'W	60	650	0.9	-	-	0.3
18	2/5	07°31'S	139°36'W	60	641	1.1	0.3	-	0.2
19	2/6	08°35'S	139°39'W	60	654	0.6	-	-	0.8
20	2/7	09°29'S	139°38'W	60	632	7.9	-	0.5	0.2
21	2/8	10°22'S	139°40'W	60	647	4.9	-	0.3	0.2
22	2/9	09°14'S	140°33'W	60	639	8.4	-	0.3	-
23	2/10	08°23'S	140°38'W	60	648	4.9	0.2	0.2	0.2
24	2/19	16°34'S	150°06'W	60	622	0.2	-	0.6	-
25	2/20	15°05'S	149°52'W	60	650	0.2	-	-	-
26	2/21	13°24'S	149°37'W	60	637	0.5	-	0.3	0.2
27	2/22	12°05'S	149°18'W	60	646	0.6	-	0.3	-
28	2/23	10°35'S	148°57'W	60	637	0.9	-	-	0.2
29	2/24	09°05'S	148°40'W	60	647	0.5	-	0.3	-
30	2/25	07°18'S	148°29'W	60	638	1.1	-	0.2	0.6
31	2/26	05°51'S	148°21'W	60	646	0.2	0.2	-	0.2
32	2/27	04°18'S	148°02'W	60	638	0.2	0.2	-	-
33	2/28	02°52'S	148°16'W	60	647	-	0.2	-	0.5
34	3/1	01°26'S	147°54'W	60	638	-	-	-	-
35	3/2	00°06'N	147°58'W	60	645	1.6	-	-	0.2
36	3/3	01°07'N	148°05'W	60	637	0.2	-	-	-
37	3/4	02°00'N	148°06'W	60	647	0.3	0.3	-	-
38	3/5	03°01'N	148°07'W	60	642	0.6	0.2	-	-

Note: Code to abbreviations - YF = Yellowfin
BE = Bigeye
ALB = Albacore
SJ = Skipjack

Table 19.--Longline catch record in numbers of fish, John R. Manning cruise 34

Station	Yellowfin	Bigeye	Albacore	Skipjack	Marlin	Shark	Miscellaneous
1	1	1	-	-	2	10	1 lancet fish
2	10	4	-	-	-	16	-
3	2	1	-	-	-	2	-
4	3	2	-	-	-	2	-
5	4 1/	1	-	1	2	17	-
6	26	17	-	1	1	11 1/	-
7	1	-	-	1	-	6	-
8	9	6	-	3	-	1	1 puffer
9	8	2	-	1	-	1	1 lancet fish
10	3	4	-	1	-	5	-
11	6	-	1	1	5	4	-
12	6	-	1	-	-	2	-
13	4	1	3	1	7	1	1 lancet fish
14	8	2	-	1	-	12 1/	-
15	25	-	-	-	6	10	-
16	10	1	1	3	1	9	-
17	6	-	-	2	1	3	1 wahoo
18	7	2	-	1	1	10	-
19	4	-	-	5	2	8	-
20	50	-	3	1	1	35	-
21	32	-	2	1	-	74 1/	-
22	54	-	2	-	3	16	-
23	32	1	1	1	1	7	1 barracuda
24	1	-	4	-	2	2	2 dolphin
25	1	-	-	-	4	1	1 barracuda, 1 lancet fish
26	3	-	2	1	-	7	1 barracuda
27	4	-	2	-	-	1	1 barracuda, 2 wahoo
28	6	-	-	1	-	1	-
29	3	-	2	-	1	6	1 barracuda, 1 shortnosed spearfish
30	7	-	1	4	1	8	2 wahoo
31	1	1	-	1	-	6	-
32	1	1	-	-	1	1	-
33	-	1	-	3	-	2	-
34	-	-	-	-	-	8	-
35	10	-	-	1	-	17	-
36	1	-	-	-	-	5	-
37	2	2	-	-	-	6	2 lancet fish 1/
38	4	1	-	-	-	5	1 wahoo
Total	355	51	25	36	42	338	

1/ Includes one caught on anchor line.

Table 20.--Summary of live-bait fishing, Charles H. Gilbert cruise 32

Date, 1957	Time, LT	Position		Number of passes	Number of minutes chummed	Number and species caught	Amount of bait, buckets	
		Latitude	Longitude					
1/25	0900	09°23'S	140°08'W	4	18	0 SJ	-	1/
1/25	0950	09°23'S	140°11'W	1	28	0 YF	3	
1/25	1044	09°25'S	140°06'W	1	3	0 SJ	< 1	
1/25	1405	09°25'S	139°58'W	7	17	0 SJ	3	
1/25	1506	09°22'S	139°57'W	2	6	0 SJ	-	
1/25	1543	09°18'S	140°02'W	1	1	0 SJ	< 1	
1/25	1558	09°18'S	140°02'W	1	1	0 SJ	< 1	
1/26	0611	09°24'S	140°07'W	4	8	0 SJ	-	
1/26	0707	09°28'S	140°06'W	2	3	0 ?	-	
1/26	0942	09°33'S	139°53'W	1	17	28 SJ, 6 YF	-	
1/26	1035	09°33'S	139°55'W	1	2	0 SJ	-	
1/26	1048	09°33'S	139°55'W	1	6	12 SJ	-	
1/26	1241	09°38'S	139°43'W	1	1	0 SJ	1/2	
1/26	1532	09°48'S	139°15'W	1	1	0 SJ	1/2	
1/26	1631	09°48'S	139°15'W	2	2	0 SJ	1/2	
1/26	1655	09°49'S	139°13'W	4	18	0 YF	5	
1/27	0754	09°58'S	139°01'W	1	1	0 ?	1/2	2/
1/27	0845	10°02'S	139°01'W	1	21	17 SJ	6	2/
1/27	0959	10°04'S	138°56'W	1	22	147 SJ	10	2/
1/27	1410	10°27'S	138°45'W	1	4	0 YF	-	2/
1/27	1426	10°27'S	138°45'W	4	8	23 SJ	6	2/
1/28	0745	09°28'S	138°53'W	2	7	0 YF, 0 SJ	-	3/
1/28	0814	09°25'S	138°54'W	1	1	0 YF	-	3/
1/28	0819	09°25'S	138°54'W	1	27	26 YF, 3 SJ	4	3/
1/28	-	-	-	1	1	0 YF	< 1	3/
1/29	0848	08°47'S	139°12'W	1	3	0 SJ	-	
1/29	1241	08°25'S	139°26'W	1	1	0 SJ	-	
1/29	1513	08°04'S	139°37'W	1	1	0 YF	-	
1/30	0517	07°53'S	140°00'W	1	18	1 YF	-	
1/30	0817	07°48'S	140°25'W	4	33	39 SJ	-	
1/31	0733	08°45'S	140°06'W	1	10	0 YF	-	
1/31	0805	08°45'S	140°06'W	2	23	36 SJ	5	
1/31	0924	08°44'S	140°12'W	4	8	0 YF	-	
1/31	1213	08°57'S	140°15'W	2	3	0 YF	-	
2/2	0812	09°19'S	140°10'W	1	3	0 SJ	-	
2/2	0900	09°25'S	140°08'W	2	31	428 SJ	14	
2/2	1114	09°38'S	140°06'W	5	27	290 SJ	20	
2/2	1314	09°15'S	140°15'W	10	16	2 SJ	-	2/
2/2	1503	09°20'S	140°15'W	6	9	0 SJ	-	3/
2/3	0541	09°27'S	140°06'W	6	18	0 SJ	2	3/
2/3	0709	09°28'S	140°04'W	2	8	55 SJ	8	2/
2/3	0818	09°15'S	140°04'W	1	3	0 SJ	-	3/
2/3	0909	09°35'S	140°04'W	2	2	0 ?	-	3/
2/4	0721	09°21'S	139°58'W	1	1	0 ?	-	3/
2/4	0735	09°21'S	139°58'W	1	1	0 SJ	-	3/

1/ Dash indicates unknown quantity. 2/ Sardines and goatfish mixed. 3/ Goatfish.

Table 20.--Summary of live-bait fishing, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Time, LT	Position		Number of passes	Number of minutes chummed	Number and species caught	Amount of bait, buckets
		Latitude	Longitude				
2/4	0752	09°21'S	139°57'W	5	20	10 SJ	15 3/
2/4	0935	09°19'S	139°57'W	6	10	0 SJ	8 3/
2/5	0833	08°49'S	139°55'W	1	2	0 SJ	- 1/
2/5	0903	08°46'S	140°00'W	3	4	0 SJ	2
2/5	0937	08°47'S	139°59'W	1	3	0 SJ	-
2/5	0950	08°47'S	139°59'W	1	3	0 YF	-
2/5	1124	08°44'S	140°10'W	4	11	0 YF	-
2/5	1152	08°45'S	140°12'W	2	6	1 LT	-
2/5	1211	08°45'S	140°12'W	4	10	0 YF	-
2/5	1255	08°45'S	140°12'W	1	2	0 ?	-
2/7	1447	08°57'S	140°15'W	11	33	226 SJ	20 2/
2/7	1641	08°57'S	140°15'W	2	4	0 SJ	- 2/
2/12	0925	14°20'S	146°06'W	1	2	0 YF	-
2/12	1127	14°38'S	146°07'W	3	16	8 YF, 46 SJ	5
2/12	1234	14°41'S	146°06'W	1	9	9 YF, 21 SJ	1-1/2
2/13	0943	15°54'S	146°22'W	2	15	170 SJ	2
2/23	0722	09°16'S	140°06'W	5	9	0 SJ	3
2/23	0800	09°17'S	140°06'W	5	10	0 SJ	2
2/23	0837	09°17'S	140°06'W	1	1	0 SJ	< 1
2/23	0852	09°17'S	140°06'W	3	6	0 SJ	4
2/23	1014	09°21'S	140°07'W	3	9	0 SJ	7
2/23	1426	09°20'S	139°56'W	1	1	0 SJ	< 1
2/24	0558	09°28'S	140°03'W	2	7	0 ?	-
2/24	0817	09°32'S	139°52'W	5	6	0 SJ	2
2/24	0945	09°34'S	139°48'W	3	9	0 SJ	1
2/24	1447	09°50'S	139°15'W	2	47	455 SJ	18
2/25	1438	10°18'S	138°46'W	3	35	505 SJ	25
2/26	1029	09°58'S	138°40'W	2	7	0 YF	2
2/26	1109	09°53'S	138°39'W	4	8	0 SJ	1
2/26	1340	09°40'S	138°46'W	1	13	0 YF	3
2/26	1421	09°40'S	138°51'W	3	15	0 SJ	2
2/26	1517	09°41'S	138°55'W	3	7	0 YF, 12 SJ	3
2/28	0830	08°54'S	140°15'W	6	17	0 SJ	9
2/28	0927	08°53'S	140°17'W	2	3	0 YF	3
2/28	0956	08°50'S	140°20'W	1	5	0 SJ	5
2/28	1556	08°06'S	140°42'W	1	11	2 YF	5
2/28	1616	08°05'S	140°44'W	1	1	0 ?	1
3/1	0550	07°55'S	140°38'W	1	11	0 YF, 1 LT	1
3/1	0754	07°50'S	140°28'W	5	19	3 SJ	6
3/1	1048	07°57'S	140°18'W	5	10	46 SJ	5
3/3	0652	08°48'S	140°00'W	1	3	0 SJ	-
3/3	1014	08°59'S	140°03'W	1	1	0 SJ	-
3/3	1351	09°00'S	140°09'W	4	8	6 SJ	-
3/4	1117	08°58'S	140°21'W	7	17	62 SJ	22
3/4	1322	08°49'S	140°29'W	1	20	167 SJ	12

1/ Dash indicates unknown quantity. 2/ Sardines and goatfish mixed. 3/ Goatfish.

Table 20. --Summary of live-bait fishing, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Time, LT	Position		Number of passes	Number of minutes chummed	Number and species caught	Amount of bait, buckets
		Latitude	Longitude				
3/5	0558	08°47'S	140°15' W	2	9	96 SJ	10
3/5	0631	08°47'S	140°16' W	1	3	15 SJ	2
3/5	0653	08°47'S	140°17' W	5	44	275 SJ	16
3/5	1155	08°45'S	140°12' W	2	3	0 YF	-
3/5	1203	08°46'S	140°18' W	2	3	0 SJ	-
3/5	1306	08°47'S	140°22'W	1	23	86 SJ	12
3/5	1441	08°53'S	140°20'W	4	12	6 SJ	6
3/5	1619	08°56'S	140°15' W	1	2	0 SJ	-
3/6	1203	09°34'S	139°30'W	3	9	2 SJ	13
3/6	1304	09°37'S	139°26'W	2	31	650 SJ	25
3/8	1233	09°06'S	140°19'W	1	25	220 SJ	25
3/8	1413	09°08'S	140°12'W	1	53	519 SJ	30
3/9	1040	09°03'S	140°10'W	?	37	160 SJ	12
		Total				4,838 SJ 52 YF	

Table 21.--Summary of fishing for bait, Charles H. Gilbert cruise 32

Date, 1957	Locality	Amount seen per day, buckets [1]	Number of sets		Catch, buckets [2]
			Day	Night	
1/24	Taiohae, Nuku Hiva	1,200	6	-	76
1/25	Hate Au Bay, Hua Pou	0	-	-	-
1/27	Taa Huku Bay, Hiva Oa	-	1	-	40
1/27	Omoa Bay, Fatu Hiva	trace	-	-	-
1/29	Invisible Bay, Ua Huka	-	1	-	few
1/29	Hananai Bay, Ua Huka	trace	-	-	-
1/31	Anaho Bay, Nuku Hiva	500	-	-	-
2/1	Taiohae, Nuku Hiva	-	8	-	74
2/4	Taipi Vai, Nuku Hiva	-	4	-	91
2/5	Taiohae, Nuku Hiva	-	1	-	22
2/6	Taiohae, Nuku Hiva	-	5	-	25
2/7	Taiohae, Nuku Hiva	-	4	-	23
2/7	Tai Oa Bay, Nuku Hiva	-	3	-	4
2/8	Hatiheu, Nuku Hiva	-	-	2	45
2/8	Hatiheu, Nuku Hiva	-	2	-	5.5
2/8	Anaho Bay, Nuku Hiva	-	2	-	600
2/22	Taiohae, Nuku Hiva	-	3	-	76
2/25	Hana Tetou, Tahu Ata	-	2	-	23
2/25	Hana Hevane, Tahu Ata	-	1	-	10
2/27	Hana Hevane, Tahu Ata	-	0	-	-
2/27	Taa Huku Bay, Hiva Oa	-	1	-	0
2/27	W. portion Vipihai Bay, Hiva Oa	0	-	-	-
2/27	Hana Menu and Hana Heka, Hiva Oa	0	-	-	-
2/28	Taiohae, Nuku Hiva	-	1	-	120
3/2	Taiohae, Nuku Hiva	-	1	-	100
3/3	Taiohae, Nuku Hiva	-	4	-	30
3/4	Taiohae, Nuku Hiva	-	2	-	27
3/5	Hakiheu, Nuku Hiva	-	-	1	130
3/6	Taiohae, Nuku Hiva	-	-	2	105
3/8	Taiohae, Nuku Hiva	-	1	2	57
3/9	Taiohae, Nuku Hiva	-	1	-	12
3/11	Taiohae, Nuku Hiva	-	5	-	83
	Total		59	7	1,778.5

[1] Dash in column 3 signifies no visual sweep of entire bay.

[2] Each bucket estimated weight 8 pounds.

Table 22.--Skipjack length frequency by sex, Charles H. Gilbert cruise 32

Date, 1957	Latitude and Longitude	Sex	Fork length range, in millimeters																														Total
			435-444	445-454	455-464	465-474	475-484	485-494	495-504	505-514	515-524	525-534	535-544	545-554	555-564	565-574	575-584	585-594	595-604	605-614	615-624	625-634	635-644	645-654	655-664	665-674	675-684	685-694	695-704	705-714	715-724	
1/26	09°33'S	M	-	-	-	-	-	-	-	-	1	-	2	4	6	6	2	2	1	-	-	1	-	-	-	-	-	-	-	-	-	25
	139°53'W	F	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	4
1/26	09°33'S	M	-	-	-	-	-	-	-	2	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
	139°55'W	F	-	-	1	-	1	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
1/27	10°02'S	M	1	1	1	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
	139°01'W	F	1	-	-	-	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
1/27	10°04'S	M	-	-	-	-	1	4	4	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
	138°56'W	F	-	-	-	2	5	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
1/27	10°27'S	M	-	-	2	2	4	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
	138°45'W	F	-	-	1	5	5	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
1/28	09°25'S	M	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
	138°54'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/30	07°48'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	2	1	-	2	-	3	2	-	-	-	-	13
	140°25'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	1	1	1	1	1	-	-	-	-	8
1/31	08°45'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	5	2	1	2		16
	140°06'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	2	-	-	-		9
2/2	09°25'S	M	-	-	-	1	1	3	-	3	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
	140°08'W	F	-	-	-	4	4	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
2/2	09°38'S	M	-	-	-	3	2	2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	140°06'W	F	-	-	-	1	-	3	2	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
2/3	09°28'S	M	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	140°04'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/4	09°21'S	M	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	139°57'W	F	-	1	-	-	2	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
2/7	08°57'S	M	-	1	-	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
	140°15'W	F	-	1	-	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
2/12	14°38'S	M	-	1	3	2	1	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
	146°07'W	F	-	2	7	1	1	1	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
2/12	14°41'S	M	-	1	2	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
	146°06'W	F	-	3	5	2	1	2	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
2/13	15°54'S	M	-	-	-	-	-	-	-	-	-	-	-	1	8	5	2	1	-	-	1	-	-	-	-	-	-	-	-	-	-	18
	146°22'W	F	-	-	-	-	-	-	-	-	-	-	1	1	-	2	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	7
2/24	09°50'S	M	3	6	2	1	3	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
	139°15'W	F	1	3	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
2/25	10°18'S	M	-	-	-	-	2	2	-	2	2	3	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
	138°46'W	F	-	-	-	-	1	1	1	2	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
2/26	09°41'S	M	-	-	-	1	2	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
	138°55'W	F	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
3/1	07°50'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2
	140°28'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1

Table 22.--Skipjack length frequency by sex, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Latitude and Longitude	Sex	Fork length range, in millimeters																																		Total
			435-444	445-454	455-464	465-474	475-484	485-494	495-504	505-514	515-524	525-534	535-544	545-554	555-564	565-574	575-584	585-594	595-604	605-614	615-624	625-634	635-644	645-654	655-664	665-674	675-684	685-694	695-704	705-714	715-724	
3/1	07°57'S	M	-	-	-	-	-	2	4	1	2	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
	140°00'W	F	-	-	1	1	2	4	1	1	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
3/3	09°00'S	M	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	140°09'W	F	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
3/4	08°58'S	M	-	-	-	-	2	1	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
	140°21'W	F	-	-	-	1	1	4	6	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
3/4	08°49'S	M	-	-	2	2	-	3	5	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	140°29'W	F	-	-	1	2	2	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
3/5	08°47'S	M	-	-	-	1	3	3	1	4	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
	140°15'W	F	-	-	-	-	2	1	3	3	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
3/5	08°47'S	M	-	-	-	-	1	-	1	3	4	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
	140°17'W	F	-	-	-	-	-	2	3	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
3/5	08°47'S	M	-	-	-	-	-	-	-	1	4	6	4	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17
	140°22'W	F	-	-	-	-	-	-	1	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8
3/5	08°53'S	M	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
	140°20'W	F	-	-	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
3/6	09°34'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	139°30'W	F	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
3/6	09°37'S	M	-	2	6	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
	139°26'W	F	-	1	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
3/8	09°06'S	M	-	-	1	1	1	3	3	5	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	140°19'W	F	-	-	-	1	1	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
3/8	09°08'S	M	-	-	-	-	3	2	3	1	-	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
	140°12'W	F	-	-	-	1	3	3	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
3/9	09°03'S	M	-	-	-	1	2	6	5	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16
	140°10'W	F	-	-	-	2	1	2	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
	Total	M	4	12	19	19	38	41	39	35	27	13	14	12	19	16	4	5	3	-	4	2	-	2	-	6	5	5	2	1	2	349
		F	3	11	22	28	40	42	43	23	20	12	4	6	-	3	-	2	1	2	2	-	1	1	1	4	6	2	-	-	-	279

Table 23. --Yellowfin length frequency by sex, Charles H. Gilbert cruise 32

Date, 1957	Latitude and Longitude	Sex	Fork length range, in millimeters																											Total
			495-504	505-514	525-534	555-564	585-594	625-634	635-644	645-654	655-664	675-684	725-734	735-744	745-754	755-764	765-774	775-784	785-794	835-844	875-884	885-894	935-944	975-984	1055-1064	1065-1074	1155-1164	1255-1264	
1/26	09°33'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	1	1	1	6
	139°53'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/28	09°25'S	M	-	-	-	-	1	-	-	-	-	-	1	1	5	3	1	-	-	-	-	1	-	-	-	-	-	-	13
	138°54'W	F	-	-	-	-	-	-	-	-	-	-	-	2	1	1	3	1	2	1	-	-	-	1	-	-	-	-	12
2/12	14°38'S	M	-	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
	146°07'W	F	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2/12	14°41'S	M	-	1	1	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
	146°06'W	F	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
	Total	M	-	1	1	1	1	-	1	1	1	1	1	1	5	3	1	-	-	-	1	1	1	-	1	1	1	1	26
		F	1	1	-	1	-	1	-	-	-	-	-	2	1	1	3	1	2	1	-	-	-	1	-	-	-	-	16

Table 24.--Marquesan sardine length frequency by sex, Charles H. Gilbert cruise 32

Date, 1957	Position		Sex	Fork length range, in millimeters										Total
	Latitude	Longitude		45-54	55-64	65-74	75-84	85-94	95-104	105-114	115-124	125-134	135-144	
1/24	08°56'S	140°05'W	M	-	-	8	47	12	2	3	-	-	-	72
			F	-	-	-	-	2	9	31	8	2	-	52
1/27	09°48'S	139°10'W	M	-	1	10	1	1	7	2	-	-	-	22
			F	-	-	-	1	-	4	2	3	-	-	10
			?	3	13	19	-	-	-	-	-	-	-	35
2/1	08°56'S	140°15'W	M	-	-	-	8	26	27	6	-	-	-	67
			F	-	-	1	3	7	13	6	-	1	-	31
			?	-	1	3	-	-	-	-	-	-	-	4
2/4	08°54'S	140°01'W	M	-	-	1	4	13	18	5	-	-	-	41
			F	-	-	-	1	6	2	3	4	-	-	16
			?	-	-	-	1	-	-	-	-	-	-	1
2/6	08°56'S	140°05'W	M	-	-	4	10	10	1	-	-	-	-	25
			F	-	-	2	7	4	-	-	-	-	-	13
			?	-	-	4	-	-	-	-	-	-	-	4
2/7	08°56'S	140°05'W	M	-	-	2	14	25	18	8	-	-	-	67
			F	-	-	-	11	24	15	23	2	-	-	75
2/7	08°57'S	140°09'W	M	-	-	-	7	10	-	-	-	-	-	17
			F	-	-	1	9	-	-	-	2	2	-	14
2/8	08°50'S	140°04'W	M	-	-	1	12	5	-	-	-	-	-	18
			F	-	-	4	11	15	1	5	5	5	1	47
			?	-	-	2	-	-	-	-	-	-	-	2
2/8	08°51'S	140°02'W	M	-	-	1	10	5	11	-	-	-	-	27
			F	-	-	3	22	5	6	6	-	1	-	43
2/22	08°56'S	140°05'W	M	-	-	-	2	10	7	10	2	-	-	31
			F	-	-	-	2	3	4	3	10	5	-	27
2/25	09°54'S	139°05'W	M	-	-	3	3	-	5	1	-	-	-	12
			F	-	-	1	4	4	2	1	-	-	-	12
2/25	09°54'S	139°04'W	M	-	-	-	1	4	8	2	-	-	-	15
			F	-	-	-	-	1	3	1	-	-	-	5
2/28	08°56'S	140°05'W	M	-	-	-	3	8	8	1	-	-	-	20
			F	-	-	-	-	7	8	2	-	-	-	17
3/2	08°56'S	140°05'W	M	-	-	-	3	8	4	2	-	-	-	17
			F	-	-	-	1	7	4	1	-	-	-	13
			?	-	-	-	1	-	-	-	-	-	-	1
3/4	08°56'S	140°05'W	M	-	-	-	-	2	4	1	-	-	-	7
			F	-	-	-	-	4	5	7	2	-	-	18
3/5	08°48'S	140°10'W	M	-	-	1	7	1	1	-	-	-	-	10
			F	-	1	3	5	-	2	-	-	-	-	11
			?	-	4	10	11	8	-	-	-	-	-	33
3/6	08°56'S	140°05'W	M	-	-	-	6	8	2	1	-	-	-	17
			F	-	-	-	7	9	-	3	3	-	-	22
			?	-	-	-	-	1	-	-	-	-	-	1
3/8	08°56'S	140°05'W	M	-	-	-	5	11	1	-	-	-	-	17
			F	-	-	-	5	8	7	-	-	-	-	20
3/9	08°56'S	140°05'W	M	-	-	-	-	10	2	1	-	-	-	13
			F	-	-	-	1	8	4	-	1	-	-	14
3/11	08°56'S	140°05'W	M	-	-	-	6	30	13	4	-	-	-	53
			F	-	-	-	7	25	18	5	2	1	-	58
	Total		M	-	1	31	149	199	139	47	2	-	-	568
			F	-	1	15	97	139	107	99	42	17	1	518
			?	3	18	38	13	9	-	-	-	-	-	81
	Grand total			3	20	84	259	347	246	146	44	17	1	1167

Table 25.--Yellowfin length frequency by sex, John R. Manning cruise 34

| Date, 1957 | Latitude and Longitude | Sex | Fork length range, in millimeters | | |

Table 25.--Yellowfin length frequency by sex, John R. Manning cruise 34 (cont'd)

| Date, 1957 | Latitude and Longitude | Sex | Fork length range, in millimeters | | |

Table 25.--Yellowfin length frequency by sex, John R. Manning cruise 34 (cont'd)

| Date, 1957 | Latitude and Longitude | Sex | Fork length range, in millimeters | | |

Table 26.--Bigeye length frequency by sex, John R. Manning cruise 34

Date, 1957	Position		Sex	Fork length range, in millimeters																																		Total
	Latitude	Longitude		1285-1294	1295-1304	1325-1334	1345-1354	1385-1394	1415-1424	1435-1444	1445-1454	1455-1464	1465-1474	1475-1484	1485-1494	1495-1504	1505-1514	1515-1524	1535-1544	1545-1554	1555-1564	1565-1574	1575-1584	1595-1604	1605-1614	1615-1624	1625-1634	1635-1644	1645-1654	1675-1684	1695-1704	1715-1724	1725-1734	1735-1744	1745-1754	2005-2014	
1/17	03°34'N	132°06'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	3
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
1/19	01°34'N	132°09'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1/20	00°07'S	132°19'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/21	01°54'S	132°07'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/22	03°30'S	132°04'W	M	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	1	-	-	-	-	-	-	-	-	6
			F	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-	1	-	-	-	-	-	-	1	-	-	-	1	1	-	1	1	-	9
1/23	04°46'S	132°10'W	M	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2
			F	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
1/24	06°22'S	132°16'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1/25	07°50'S	132°02'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
			F	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1/26	09°38'S	132°03'W	M	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			F	1	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
1/29	14°02'S	132°03'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/1	10°47'S	138°38'W	M	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			F	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2/3	08°34'S	138°34'W	M	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/5	07°31'S	139°36'W	M	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/10	08°24'S	140°38'W	M	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/26	05°52'S	148°22'W	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1

Table 26.--Bigeye length frequency by sex, John R. Manning cruise 34 (cont'd)

| Date, 1957 | Position | | Sex | Fork length range, in millimeters | | |

Table 27.--Albacore length frequency by sex, John R. Manning cruise 34

Date, 1957	Position		Sex	Fork length range, in millimeters								Total
	Latitude	Longitude		905-914	915-924	925-934	935-944	945-954	965-974	995-1004	1055-1064	
1/27	10°58'S	132°04'W	M	-	-	-	-	1	-	-	-	1
			F	-	-	-	-	-	-	-	-	-
1/28	12°30'S	132°07'W	M	-	-	-	-	-	-	-	-	-
			F	-	-	-	1	-	-	-	-	1
1/29	14°02'S	132°03'W	M	-	-	-	-	-	1	-	-	1
			F	-	-	1	-	1	-	-	-	2
2/3	08°34'S	138°34'W	M	-	-	-	-	-	-	-	-	-
			F	-	-	-	-	1	-	-	-	1
2/7	09°30'S	139°38'W	M	-	-	-	-	-	-	-	-	-
			F	-	1	2	-	-	-	-	-	3
2/8	10°22'S	139°40'W	M	-	-	-	-	-	-	-	-	-
			F	1	-	1	-	-	-	-	-	2
2/9	09°14'S	140°34'W	M	-	-	-	-	-	-	-	1	1
			F	-	-	-	-	-	-	-	-	-
2/10	08°24'S	140°38'W	M	-	-	-	-	-	-	1	-	1
			F	-	-	-	-	-	-	-	-	-
2/20	15°05'S	149°52'W	M	-	-	-	-	-	1	-	-	1
			F	-	-	-	-	-	-	-	-	-
2/21	13°24'S	149°37'W	M	-	-	-	-	1	1	-	-	2
			F	-	-	-	-	-	-	-	-	-
2/22	12°06'S	149°18'W	M	-	-	-	-	-	-	-	-	-
			F	-	-	-	1	-	-	-	-	1
2/24	09°06'S	148°40'W	M	-	-	-	1	-	-	-	-	1
			F	-	-	-	-	-	-	-	-	-
2/25	07°18'S	148°29'W	M	-	-	-	-	-	-	-	-	-
			F	-	-	1	-	-	-	-	-	1
	Total		M	-	-	-	1	2	3	1	1	8
			F	1	1	5	2	2	-	-	-	11
	Grand total			1	1	5	3	4	3	1	1	19

Table 28.--Skipjack length frequency by sex, John R. Manning cruise 34

Date, 1957	Latitude and Longitude	Sex	Fork length range, in millimeters																Total
			466-474	535-544	545-554	605-614	665-674	685-694	705-714	725-734	735-744	745-754	755-764	765-774	775-784	785-794	795-804	815-824	
1/22	03°29'S	M	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
	132°04'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/23	04°46'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	132°09'W	F	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
1/24	06°22'S	M	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	2
	132°15'W	F	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
1/25	07°49'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	132°02'W	F	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
1/26	09°37'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	132°03'W	F	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
1/27	10°58'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	132°03'W	F	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
1/29	14°02'S	M	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
	132°03'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/1	10°47'S	M	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
	138°38'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/3	08°33'S	M	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	2
	138°34'W	F	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
2/4	07°35'S	M	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	2
	138°38'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/5	07°31'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	139°36'W	F	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
2/6	08°35'S	M	-	-	-	-	1	-	-	-	1	1	-	-	1	-	-	-	4
	139°39'W	F	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
2/7	09°29'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
	139°38'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/8	10°22'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	139°40'W	F	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2/10	08°23'S	M	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	140°38'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/21	13°24'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
	149°37'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/23	10°35'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	148°57'W	F	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2/25	07°18'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
	148°29'W	F	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	2
2/26	05°51'S	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
	148°21'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2/28	02°52'S	M	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	2
	148°16'W	F	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
3/2	00°06'N	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
	147°58'W	F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	M	-	-	1	-	1	1	-	-	2	4	1	2	4	2	3	2	23
		F	1	1	-	1	-	-	1	1	2	1	2	1	1	-	-	-	12
	Grand total		1	1	1	1	1	1	1	1	4	5	3	3	5	2	3	2	35

Table 29.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, Hugh M. Smith cruise 38

Date, 1957	Noon position		Flocks											Scattered birds								Tuna schools		
				Size			Composition																	
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other		Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
1/13	17°26'N	153°18'W	1	-	-	1	1	1	-	1	1	-		-	-	-	-	-	-	-	-	-	1	-
1/14	15°33'N	150°07'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	1	-	-	-	-
1/15	13°42'N	146°52'W	2	-	1	1	2	-	-	-	1	-		-	-	-	-	-	-	3	-	-	-	2
1/16	11°53'N	144°00'W	2	-	-	2	2	-	-	-	2	-		-	12	-	4	-	4	17	-	-	-	2
1/17	10°13'N	141°02'W	-	-	-	-	-	-	-	-	-	-		-	-	-	1	-	-	14	-	-	-	-
1/18	08°32'N	138°04'W	-	-	-	-	-	-	-	-	-	-		-	-	-	5	-	1	13	-	-	-	-
1/19	06°40'N	134°38'W	-	-	-	-	-	-	-	-	-	-		-	10	-	-	-	2	17	-	-	-	-
1/20	04°32'N	131°52'W	1	-	1	-	-	-	-	-	1	-		-	19	-	11	-	-	7	-	-	-	-
1/21	02°44'N	128°50'W	-	-	-	-	-	-	-	-	-	-		-	8	-	-	-	-	1	-	-	-	-
1/22	00°34'N	125°50'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	-	4	-	-	-	-
1/23	00°03'N	122°54'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	1	3	-	-	-	-
1/24	00°24'N	119°50'W	-	-	-	-	-	-	-	-	-	-		-	9	-	-	-	-	4	-	-	-	-
1/25	00°15'S	116°49'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	-	2	-	-	-	-
1/26	00°08'S	113°27'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	1	-	-	-	-
1/27	00°12'S	110°12'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	-	5	-	-	1	-
1/28	03°24'S	110°01'W	-	-	-	-	-	-	-	-	-	-		-	1	-	2	-	-	2	-	-	-	-
1/29	06°58'S	110°01'W	-	-	-	-	-	-	-	-	-	-		-	2	-	-	-	-	8	-	-	-	-
1/30	10°10'S	109°59'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	1	7	-	-	-	-
1/31	13°06'S	110°03'W	-	-	-	-	-	-	-	-	-	-		-	-	-	4	-	-	1	4	-	1	-
2/1	13°32'S	110°11'W	1	1	-	-	-	-	1	-	-	-		-	-	-	1	-	1	1	-	-	2	-
2/21	10°39'S	122°29'W	-	-	-	-	-	-	-	-	-	-		-	-	-	2	-	-	-	-	-	-	-
2/22	07°43'S	125°36'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	2	-	-	-	-
2/23	05°20'S	128°23'W	3	-	3	-	3	-	-	-	-	-		-	-	-	1	-	4	1	-	-	-	3
2/24	01°52'S	129°37'W	1	1	-	-	-	-	-	-	1	-		-	1	-	-	1	-	2	-	-	1	1
2/25	01°35'S	129°51'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	5	-	-	1	-
2/26	04°59'S	130°06'W	3	-	1	2	3	-	1	-	1	-		-	-	-	-	-	2	2	-	-	1	1
2/27	08°29'S	130°02'W	1	-	-	1	1	-	1	1	1	-		1	1	-	5	-	1	6	1	-	1	-
2/28	11°56'S	129°59'W	4	-	-	4	3	-	-	2	1	-		3	2	-	-	-	-	4	1	-	2	2
3/1	15°22'S	129°53'W	4	1	1	2	4	-	1	2	2	1		-	11	-	1	-	-	2	-	-	1	3
3/2	18°08'S	130°40'W	-	-	-	-	-	-	-	-	-	-		-	5	1	-	-	3	1	-	-	1	-
3/3	17°50'S	134°01'W	-	-	-	-	-	-	-	-	-	-		-	7	-	-	-	-	-	-	-	1	-
3/4	17°37'S	136°42'W	-	-	-	-	-	-	-	-	-	-		-	7	-	1	-	1	2	-	-	-	-
3/5	17°43'S	139°54'W	1	-	-	1	1	-	-	1	1	-		-	3	1	3	-	10	-	-	-	1	-
3/6	17°59'S	140°58'W	-	-	-	-	-	-	-	-	-	-		-	-	2	5	1	3	-	-	-	-	-
3/7	18°03'S	144°13'W	-	-	-	-	-	-	-	-	-	-		-	3	-	2	-	-	-	-	-	-	-
3/8	17°57'S	147°36'W	-	-	-	-	-	-	-	-	-	-		-	4	9	4	1	-	-	-	-	-	-
3/14	15°04'S	146°44'W	5	-	2	3	5	1	-	-	2	-		-	13	13	37	-	-	-	-	-	-	4
3/15	12°28'S	144°59'W	1	-	-	1	1	-	1	-	1	-		-	5	-	7	-	-	2	-	1[1/]	2[1/]	-
3/16	09°23'S	145°09'W	2	1	-	1	1	-	1	-	1	-		-	4	3	-	-	1	6	-	1	-	-
3/17	06°19'S	145°01'W	2	-	2	-	2	1	-	-	-	1		-	12	1	13	-	-	5	-	-	-	1

1/ One mixed YF-SJ school.

Table 29.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, Hugh M. Smith cruise 38 (cont'd)

Date, 1957	Noon position		Flocks										Scattered birds								Tuna schools		
				Size			Composition																
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other	Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
3/18	03°16'S	144°57'W	-	-	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-	-
3/19	00°42'S	144°58'W	5	-	1	4	5	1	1	-	3	-	-	-	-	2	-	-	-	-	-	3	1
3/20	02°02'N	145°05'W	2	-	2	-	2	-	1	-	1	-	-	4	3	-	-	-	-	-	-	-	2
3/21	05°16'N	147°11'W	1	-	-	1	1	-	-	1	1	-	-	26	8	17	-	1	9	-	-	-	1
3/22	08°20'N	149°17'W	1	-	1	-	1	-	-	-	1	-	-	10	7	2	-	-	1	-	-	-	1
3/23	11°23'N	151°26'W	-	-	-	-	-	-	-	-	-	-	-	16	-	4	-	-	4	-	-	-	-
3/24	14°37'N	153°36'W	-	-	-	-	-	-	-	-	-	-	-	11	2	3	-	-	5	-	-	-	-
	Total		43	4	15	24	38	4	8	8	22	2	4	213	51	137	3	36	170	6	2	20	24

Table 30.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, Charles H. Gilbert cruise 32

Date, 1957	Noon position		Flocks											Scattered birds								Tuna schools		
			Size				Composition																	
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other	Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
1/12	21°44.0'N	158°03.5'W	1	-	1	-	1	-	-	-	-	-	1	4	6	-	-	-	-	-	-	-	1
1/13	20°20.5'N	156°52.0'W	-	-	-	-	-	-	-	-	-	-	-	36	-	-	-	-	-	4	-	-	-
1/14	17°19.0'N	155°09.0'W	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-
1/15	14°30.0'N	153°08.0'W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
1/16	11°31.0'N	151°31.5'W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
1/17	08°41.0'N	150°00.0'W	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	5	7	-	-	-	-
1/18	05°59.0'N	147°57.0'W	2	-	2	-	1	-	-	1	2	-	-	20	-	-	-	-	13	-	-	1	1
1/19	03°14.0'N	146°03.5'W	-	-	-	-	-	-	-	-	-	-	-	37	-	6	6	-	11	-	-	-	-
1/20	00°28.5'S	144°37.0'W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
1/21	02°36.5'S	142°55.0'W	-	-	-	-	-	-	-	-	-	-	-	19	-	10	1	1	26	-	-	-	-
1/22	05°46.0'S	141°33.5'W	-	-	-	-	-	-	-	-	-	-	-	20	-	16	12	5	20	-	-	-	-
1/23	08°57.5'S	140°05.0'W	1	-	-	-	-	-	-	-	-	-	-	19	3	9	5	3	1	-	-	-	1
1/25	09°27.0'S	140°05.5'W	12	-	2	10	12	2	2	6	12	-	-	-	-	-	-	-	-	-	-	8	3
1/26	09°36.0'S	139°48.0'W	24	1	2	21	23	22	1	20	19	-	-	5	1	5	-	-	-	-	3[1/]	17[2/]	6
1/27	10°13.0'S	138°45.5'W	12	-	2	10	11	10	1	9	12	-	-	-	-	-	-	-	-	-	1	4	6
1/28	09°09.5'S	139°15.5'W	9	-	2	7	8	5	-	5	7	-	-	-	-	-	-	-	-	-	1[3/]	2[4/]	6
1/29	08°27.0'S	139°25.0'W	13	-	6	7	12	11	1	5	13	-	-	-	-	-	-	-	-	-	-	5	3
1/30	08°00.0'S	140°44.5'W	14	-	8	6	12	9	-	5	11	-	-	135	35	55	60	-	-	-	-	2	7
1/31	08°54.5'S	140°15.0'W	13	1	5	7	11	6	-	7	7	-	-	25	1	10	-	1	-	-	2[5/]	3[6/]	5
2/2	09°34.0'S	140°06.0'W	9	-	4	5	9	9	-	5	9	-	-	-	-	-	-	-	-	-	-	4	3
2/3	09°42.0'S	140°12.5'W	16	-	2	14	16	13	-	9	14	-	-	-	-	-	-	-	-	-	-	6	10
2/4	09°00.0'S	140°01.5'W	5	-	1	4	4	4	-	2	5	-	-	-	-	-	-	-	-	-	-	3	3
2/5	08°45.0'S	140°11.5'W	13	-	3	10	13	9	-	3	1	-	-	-	-	-	-	-	-	-	2	1	6
2/6	Taiohae, Nuku Hiva		4	-	4	-	4	1	-	-	3	-	-	-	-	-	-	-	-	-	-	1	-
2/7	08°57.5'S	140°09.0'W	6	-	-	6	6	3	-	4	5	-	-	-	-	-	-	-	-	-	-	2	4
2/10	10°05.0'S	141°26.5'W	7	2	1	4	7	3	-	4	5	-	-	-	-	-	-	-	-	-	-	-	4
2/11	12°12.0'S	144°01.0'W	3	1	2	-	3	1	-	3	3	-	-	32	-	74	-	5	-	-	-	-	1
2/12	14°38.0'S	146°07.5'W	7	-	2	5	7	5	-	6	7	-	-	10	-	33	-	-	-	-	4[7/]	2[8/]	1
2/13	16°02.0'S	146°36.5'W	12	-	6	6	12	1	-	1	9	-	-	12	-	12	-	-	-	-	-	1	7
2/18	Papeete, Tahiti		-	-	-	-	-	-	-	-	-	-	-	2	13	7	-	-	-	-	-	-	-
2/19	15°23.5'S	147°23.5'W	10	-	2	8	10	7	-	5	10	-	-	-	-	-	-	-	-	-	1[9/]	3[10/]	7
2/20	13°28.5'S	144°40.5'W	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-
2/21	11°20.0'S	142°15.0'W	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	1	-	-	-	-
2/22	09°04.0'S	140°14.0'W	6	-	-	6	6	4	-	1	3	-	-	11	9	16	-	-	-	-	-	-	6
2/23	09°27.0'S	140°04.5'W	16	-	4	12	16	14	-	6	16	-	-	-	-	-	-	-	-	-	-	5	8
2/24	09°41.0'S	139°35.0'W	21	-	6	15	21	17	-	2	19	-	-	-	-	-	-	-	-	-	-	8	10
2/25	10°05.0'S	139°03.0'W	5	-	4	1	5	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	1
2/26	09°51.0'S	138°40.0'W	15	-	4	11	15	10	-	6	15	-	-	-	-	-	-	-	-	-	3	4	6
2/27	09°48.5'S	139°01.5'W	2	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
2/28	08°35.0'S	140°28.0'W	19	-	7	12	19	17	-	10	15	-	-	-	-	-	-	-	-	-	2	4	9

Table 30.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, Charles H. Gilbert cruise 32 (cont'd)

Date, 1957	Noon position		Flocks										Scattered birds								Tuna schools		
				Size			Composition																
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other	Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
3/1	08°02.5'S	140°18.0'W	14	-	2	12	14	12	-	7	10	-	-	-	-	-	-	-	-	-	2	2	11
3/3	09°09.0'S	140°05.5'W	10	-	2	8	10	10	-	4	10	-	-	-	-	-	-	-	-	-	-	2	7
3/4	08°58.0'S	140°21.0'W	7	-	2	5	7	5	1	4	6	-	-	-	-	-	-	-	-	-	-	2	3
3/5	08°45.0'S	140°14.0'W	20	-	4	16	20	18	-	7	18	-	-	-	-	-	-	-	-	-	2	10	8
3/6	09°33.5'S	139°29.5'W	15	-	5	10	15	14	-	7	13	-	-	-	-	-	-	-	-	-	-	6	8
3/7	09°25.0'S	139°35.5'W	11	-	5	6	11	7	-	4	9	-	-	35	9	15	4	-	-	-	-	1	9
3/8	09°40.0'S	140°23.0'W	5	-	2	3	5	4	-	3	4	-	-	5	-	10	-	-	-	-	-	2	4
3/9	09°00.0'S	140°08.0'W	1	-	-	1	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-
3/12	08°52.0'S	140°15.5'W	10	1	-	9	9	9	-	6	9	-	-	-	-	-	-	-	-	-	-	3	5
3/13	05°48.0'S	141°53.0'W	5	-	2	3	5	5	-	1	5	-	-	5	1	24	-	1	-	-	-	-	-
3/14	02°45.0'S	143°34.0'W	1	-	-	1	1	-	-	-	-	-	-	11	-	19	-	-	-	-	-	-	1
3/15	00°07.5'N	145°14.0'W	1	-	-	1	1	1	-	-	1	-	-	38	1	7	-	1	14	-	-	-	1
3/16	03°24.0'N	146°58.5'W	2	-	2	-	2	1	-	-	1	-	-	27	3	2	-	-	3	-	-	1	-
3/17	06°30.0'N	148°21.0'W	-	-	-	-	-	-	-	-	-	-	-	28	11	-	-	2	-	-	-	-	-
3/18	09°06.5'N	150°12.0'W	1	-	1	-	-	-	-	-	1	-	-	36	4	-	-	-	-	-	-	-	1
3/19	11°54.5'N	151°54.5'W	-	-	-	-	-	-	-	-	-	-	-	38	2	1	-	-	-	-	-	-	-
3/20	14°52.5'N	153°32.0'W	1	-	1	-	-	-	-	-	1	-	-	25	4	2	-	-	-	-	-	-	-
3/21	17°50.5'N	155°39.5'W	2	-	-	2	2	2	-	1	1	1	-	50	6	49	-	-	-	-	-	-	1
3/22	20°42.5'N	157°34.5'W	1	-	-	1	1	-	-	-	1	-	10	56	2	32	-	-	-	-	-	-	-
	Total		384	6	112	265	369	272	7	170	315	1	11	754	111	418	89	29	102	4	24	116	185

1/ All 3 schools mixed YF and SJ.
2/ Three schools mixed YF and SJ.
3/ Mixed SJ and YF school.
4/ One mixed SJ and YF school.
5/ One mixed YF and SJ school.
6/ One mixed SJ and YF school.
7/ Two mixed schools.
8/ Mixed schools.
9/ Mixed school.
10/ One mixed school.

Table 31.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, John R. Manning cruise 34

Date, 1957	Noon position		Flocks											Scattered birds								Tuna schools		
				Size			Composition																		
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other		Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
1/5	19°58.5'N	156°26.5'W	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	1	-	-	-	-	-
1/6	18°14.0'N	154°34.5'W	-	-	-	-	-	-	-	-	-	-		1	-	-	-	-	-	-	-	-	-	-
1/9	14°41.0'N	148°36.0'W	-	-	-	-	-	-	-	-	-	-		1	-	-	1	-	1	3	-	-	-	-
1/10	13°35.0'N	146°20.0'W	1	1	-	-	1	-	1	-	-	-		-	6	1	-	-	-	3	-	-	-	-
1/11	12°16.0'N	144°12.0'W	-	-	-	-	-	-	-	-	-	-		-	5	-	-	-	-	1	-	-	-	-
1/12	10°48.0'N	141°44.0'W	-	-	-	-	-	-	-	-	-	-		-	9	-	-	-	2	11	-	-	-	-
1/13	09°05.0'N	139°24.5'W	-	-	-	-	-	-	-	-	-	-		-	16	-	-	-	1	26	-	-	-	-
1/14	07°35.0'N	136°43.5'W	1	-	-	1	1	-	-	-	1	-		-	4	-	4	-	-	7	-	-	-	1
1/15	05°39.5'N	134°12.5'W	2	-	-	2	2	-	-	-	2	-		-	7	-	-	-	-	6	-	2	-	-
1/16	04°29.0'N	132°17.0'W	-	-	-	-	-	-	-	-	-	-		-	4	-	-	-	-	-	-	-	-	-
1/17	03°32.0'N	132°05.0'W	-	-	-	-	-	-	-	-	-	-		-	4	-	-	-	-	-	-	-	-	-
1/19	01°34.0'N	132°09.0'W	-	-	-	-	-	-	-	-	-	-		-	3	-	-	-	-	-	-	-	-	-
1/20	00°07.0'S	132°19.0'W	-	-	-	-	-	-	-	-	-	-		-	3	-	-	-	-	-	-	-	-	-
1/23	04°46.5'S	132°08.0'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	-	-	-	-	-	-
1/25	07°51.0'S	132°00.0'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	1	-	-	-	-	-
1/26	09°37.5'S	132°03.0'W	-	-	-	-	-	-	-	-	-	-		-	1	-	1	-	-	-	-	-	-	-
1/27	10°58.0'S	132°03.5'W	-	-	-	-	-	-	-	-	-	-		-	2	-	-	-	2	-	-	-	-	-
1/28	12°29.5'S	132°07.0'W	-	-	-	-	-	-	-	-	-	-		-	2	-	2	-	-	-	-	-	-	-
1/29	14°02.0'S	132°03.0'W	-	-	-	-	-	-	-	-	-	-		-	1	-	-	-	-	-	-	-	-	-
1/30	12°56.5'S	134°19.0'W	-	-	-	-	-	-	-	-	-	-		-	7	-	-	-	-	3	-	-	-	-
1/31	11°31.5'S	137°20.0'W	13	-	5	8	13	-	-	4	11	1		-	16	-	7	-	-	-	-	-	2	10
2/1	10°47.0'S	138°38.5'W	3	1	1	1	2	2	-	1	2	-		-	9	12	6	2	-	-	-	-	1	-
2/2	09°31.0'S	138°39.0'W	-	-	-	-	-	-	-	-	-	-		-	4	2	9	-	2	-	-	-	-	-
2/3	08°33.5'S	138°34.0'W	1	-	-	1	1	1	-	-	-	-		-	1	13	21	-	1	2	-	-	1	1
2/4	07°35.0'S	138°38.5'W	1	-	1	-	1	-	-	-	-	-		-	2	-	20	6	2	1	-	-	-	2
2/5	07°31.0'S	139°36.0'W	6	-	1	5	6	4	1	3	3	-		-	2	-	14	1	-	-	-	-	-	5
2/6	08°25.5'S	139°39.0'W	7	-	3	4	7	7	-	2	5	-		-	4	4	23	1	-	-	-	-	-	7
2/7	09°29.5'S	139°38.5'W	1	-	1	-	1	-	-	-	-	-		-	2	1	28	3	-	-	-	-	-	-
2/8	10°22.5'S	139°40.5'W	1	-	1	-	1	-	-	-	1	-		-	1	1	5	-	1	-	-	-	-	1
2/9	09°14.5'S	140°33.5'W	1	-	1	-	1	1	-	1	-	-		-	1	4	21	-	-	-	-	-	-	1
2/10	08°24.0'S	140°36.5'W	3	-	1	2	3	-	-	2	2	-		-	6	-	15	-	-	-	-	-	6	1
2/11	10°26.0'S	142°22.0'W	-	-	-	-	-	-	-	-	-	-		-	2	-	2	1	-	-	-	-	-	-
2/12	12°43.0'S	144°51.5'W	3	-	3	-	3	1	-	-	-	-		-	5	1	15	-	-	-	-	-	-	-
2/13	15°22.0'S	147°06.5'W	4	1	2	1	3	1	1	-	1	-		-	5	10	9	-	1	-	-	-	-	4
2/14	Papeete, Tahiti		1	-	-	1	1	1	-	-	-	1		-	-	-	-	-	-	-	-	-	-	1
2/18	Papeete, Tahiti		1	-	1	-	1	1	-	-	1	-		-	-	-	-	-	-	-	-	-	1	-
2/19	16°34.5'S	150°04.5'W	-	-	-	-	-	-	-	-	-	-		-	5	19	2	1	-	-	-	-	-	-
2/20	15°05.0'S	149°52.5'W	1	-	1	-	1	1	-	-	-	-		-	1	-	-	-	-	-	-	-	-	-
2/21	13°24.0'S	149°37.0'W	-	-	-	-	-	-	-	-	-	-		-	13	-	-	-	-	-	-	-	-	-
2/22	12°05.5'S	149°18.5'W	-	-	-	-	-	-	-	-	-	-		-	2	-	-	-	-	-	-	-	-	-

Table 31.--Record of daily sightings of bird flocks, scattered birds, and tuna schools, John R. Manning cruise 34 (cont'd)

Date, 1957	Noon position		Flocks										Scattered birds							Tuna schools		
				Size			Composition															
	Latitude	Longitude	Total number	< 10	10 - 50	> 50	Terns	Boobies	Bo'sun birds	Frigate birds	Petrels or shearwaters	Other	Albatross	Petrels or shearwaters	Boobies	Terns	Frigate birds	Bo'sun birds	Storm petrels	Other	Yellowfin	Skipjack	Unidentified
2/23	10°35.5'S	148°57.0'W	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	1	-	-	-	-
2/24	09°05.5'S	148°40.5'W	1	-	1	-	1	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-
2/28	02°52.5'S	148°16.5'W	2	-	2	-	2	2	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-
3/1	01°26.0'S	147°54.0'W	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/2	00°06.5'N	147°58.0'W	-	-	-	-	-	-	-	-	-	-	-	3	1	1	-	-	-	-	-	-	-
3/3	01°07.5'N	148°05.5'W	-	-	-	-	-	-	-	-	-	-	-	2	6	-	-	-	-	-	-	-	-
3/4	02°00.0'N	148°06.0'W	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
3/5	03°01.0'N	148°07.0'W	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-
3/6	05°18.0'N	149°17.5'W	-	-	-	-	-	-	-	-	-	-	-	5	2	6	-	1	-	-	-	-	-
3/7	07°40.0'N	150°30.0'W	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	1	-	-	-	-	-
3/8	10°15.0'N	152°04.5'W	-	-	-	-	-	-	-	-	-	-	1	8	-	1	-	2	-	-	-	-	-
3/9	12°52.0'N	153°37.5'W	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
3/10	15°19.0'N	155°00.0'W	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-
3/11	18°08.0'N	156°20.5'W	1	-	1	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
3/12	21°10.0'N	157°53.0'W	1	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1
		Total	57	3	28	26	54	22	3	14	31	3	8	187	79	227	15	19	64	-	2	11	35

Table 32.--Record of aquatic mammals sighted, Hugh M. Smith cruise 38, Charles H. Gilbert cruise 32, and John R. Manning cruise 34

Date, 1957	Time, LT	Position		Observation	Number
		Latitude	Longitude		
1/5	1740	19°18'N	156°01'W	Porpoise	15
1/17	1550	09°57'N	140°33'W	Whale	2
1/22	1432	00°21'N	125°32'W	Killer whale	10-40
1/26	1548	00°03'N	112°53'W	Killer whale	15
1/28	1020	00°12'S	110°21'W	Killer whale	5
1/30	1740	05°01'S	140°46'W	Porpoise	50
2/1	0910	10°47'S	138°38'W	Blackfish	20
2/2	0718	09°16'S	140°08'W	Killer whale	10
2/4	1210	08°59'S	140°01'W	Porpoise	10
2/6	1020	08°36'S	139°39'W	Blackfish	1
2/13	1250	15°26'S	147°12'W	Killer whale	15
2/13	1413	15°32'S	147°22'W	Killer whale	6
2/18	1740	17°21'S	149°39'W	Porpoise	3
2/22	0945	09°17'S	140°28'W	Porpoise	-
2/24	1235	01°46'S	129°38'W	Porpoise	100
2/24	1507	01°23'S	129°43'W	Porpoise	200
2/26	0625	10°28'S	135°36'W	Porpoise	6
2/26	1230	09°48'S	138°43'W	Porpoise	-
2/27	1530	09°47'S	139°12'W	Porpoise	-
2/28	0755	11°22'S	129°59'W	Sperm whale	3
2/28	0905	08°53'S	140°16'W	Whale	12
2/28	1505	12°24'S	130°02'W	Sperm whale	2
3/1	0845	01°26'S	147°54'W	Blackfish	12
3/1	1700	01°21'S	147°45'W	Humpback whale	3
3/1	1622	08°41'S	140°15'W	Porpoise	50
3/2	0658	18°00'S	130°06'W	Porpoise	200
3/5	1428	08°49'S	140°19'W	Porpoise	2
3/7	1545	09°04'S	139°57'W	Porpoise	10
3/7	1620	09°00'S	140°01'W	Porpoise	20
3/8	0915	09°13'S	140°08'W	Porpoise	5
3/12	1145	08°54'S	140°15'W	Porpoise	50
3/14	1336	02°35'S	143°40'W	Porpoise	75
3/15	0747	00°23'S	144°56'W	Porpoise	200
3/15	1415	00°26'N	145°24'W	Porpoise	1
3/15	1517	00°34'N	145°28'W	Porpoise	4
3/21	1750	05°59'N	147°44'W	Sperm whale	4
3/22	0807	07°49'N	148°56'W	Porpoise	50-100
3/22	1410	20°56'N	157°48'W	Whale	2

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ANALYSIS OF CATCH STATISTICS OF THE HAWAIIAN SKIPJACK FISHERY

BY DANIEL T. YAMASHITA

FISHERY BULLETIN 134

From Fishery Bulletin of the Fish and Wildlife Service

VOLUME 58

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR, Fred A. Seaton, *Secretary*
FISH AND WILDLIFE SERVICE, Arnie J. Suomela, *Commissioner*

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ABSTRACT

The catch statistics of the Hawaiian skipjack fishery and its associated live-bait fishery for the period 1900 through 1953 are brought together from all available records.

The various facets of the live-bait fishery, the only important one in the central Pacific, the methods of data collection for the skipjack and live-bait fisheries, and the completeness and accuracy of the catch records, are analyzed. Skipjack records in terms of weight caught were nearly complete for 1945 through 1953, as an estimated 94 percent of the catch was reported compared with an estimate of only two-thirds to three-fourths of the catch in earlier records. The bait-catch records for 1946 through 1953 were approximately 75 percent complete.

A description of the 1953 fishing fleet and the essential specifications of the sampans in the Territory of Hawaii, information which may be useful in evaluating future changes in catch per unit of effort, are presented.

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ANALYSIS OF CATCH STATISTICS OF THE HAWAIIAN SKIPJACK FISHERY

By DANIEL T. YAMASHITA, *Fishery Research Biologist*

BUREAU OF COMMERCIAL FISHERIES

The skipjack or aku, *Katsuwonus pelamis* (Linnaeus), is widely distributed over the world, occurring in most tropical and subtropical seas. It supports the largest fishery in Hawaii, both in weight and value of fish taken. The Pacific Oceanic Fishery Investigations (POFI) of the United States Fish and Wildlife Service has studied the Hawaiian fishery and the general biology of the skipjack in this region as a part of its general program of research on the tuna resources of the central Pacific.

This report presents and analyzes the available catch statistics for the Hawaiian skipjack fishery and associated live-bait fishery for the period 1900–1953. It includes historical data necessary to an interpretation of the statistics, and also provides a description of the 1953 fishing fleet, which may be helpful in evaluating future changes in catch per unit of effort. It supplements a previous report by June (1951), in which he described the methods used in the skipjack fishery.

The basic statistics used in this report, unless otherwise stated, have been collected by the Hawaiian Division of Fish and Game, and some have been published in the form of biennial reports and monthly catch reports. The collection of such data is done routinely for fish of all species caught in Hawaiian waters.

I am particularly indebted to Vernon E. Brock, Director of the Hawaiian Division of Fish and Game, for making the catch records available for this analysis, and to Yoshio Yamaguchi and Tamotsu Shimizu for their generous help with this study.

THE SKIPJACK FISHERY

From a modest beginning, when the fish were dried or sold on the fresh market, the Hawaiian skipjack fishery has developed into one of the important industries of Hawaii, with most of the fish now being canned. The present Honolulu cannery was established in 1917 and incorporated in 1922 as the Hawaiian Tuna Packers, Ltd. The Nawiliwili Canning Co., Ltd., began operation in 1951 at Nawiliwili, Kauai, but the cannery closed in 1954. At present, the Honolulu cannery and the fresh market are able to utilize all of the skipjack landed, which annually amounts to about 50 to 70 percent by weight of the total fish taken in the Territory.

The available statistics on these landings are presented in figure 1 and tables 1 and 2. These data show landings of less than a million pounds in 1900 and 1903, an annual average of about 5 million pounds from 1928 to 1936, and a pre-World War II peak of more than 13 million pounds in 1940. After the war the landings built up, with minor interruptions, from a low of less than a million pounds in 1944 to a peak of 12.9 million pounds in 1951, which was followed by a poor catch in 1952 and another good year in 1953.

TABLE 1.—*Weight and value of Hawaiian skipjack* (Katsuwonus pelamis) *landed before and during early period of World War II*

[Landings: in thousands of pounds; price: per pound]

Year	Market		Cannery		Total landings	Average price/pound
	Landings	Price	Landings	Price		
1900	422	$0.100			422	$0.100
1903	761	.041			761	.041
1928 [1]	2,878	.069	1,547	$0.020	4,425	.052
1929 [1]	2,964	.071	374	.026	3,338	.066
1930 [1]	3,918	.053	2,319	.023	6,237	.042
1931 [1]					6,123	
1932 [1]					3,162	.058
1933 [1]	2,892	.046	2,669	.020	5,561	.034
1934 [1]	2,982	.047	4,942	.023	7,924	.032
1935 [1]	4,873	.044			4,873	.044
1936 [1]	4,674	.038	[2] 989	[2] .037	5,663	.038
1936 [3]			2,071	.036	2,071	.036
1937	403	.053	12,384	.038	12,787	.039
1938	494	.054	9,228	.040	9,722	.041
1939	407	.058	8,198	.040	8,605	.041
1940	2,112	.036	11,308	.040	13,420	.039
1941	1,050	.040	2,602	.040	3,652	.040
1942					10	.278

[1] Fiscal year ending June 30.
[2] January to June 1936.
[3] July to December 1936.

NOTE.—Approved for publication April 4, 1957. Fishery Bulletin 134.

TABLE 2.—*Weight and value of Hawaiian skipjack* (Katsuwonus pelamis) *landed March 1944 to December 1953*

[Based on catch records of the Hawaiian Division of Fish and Game]

Year	January	February	March	April	May	June	July
1944:							
Pounds sold			41,668	68,914	132,524	76,751	35,882
Price/pound			$0.293	$0.278	$0.242	$0.258	$0.273
1945:							
Pounds sold	71,065	74,278	84,747	99,384	160,199	135,327	532,071
Price/pound	$0.272	$0.250	$0.251	$0.251	$0.262	$0.270	$0.253
1946:							
Pounds sold	206,952	249,643	108,119	245,018	612,493	981,592	743,267
Price/pound	$0.240	$0.275	$0.276	$0.274	$0.262	$0.157	$0.154
1947:							
Pounds sold	441,911	163,975	232,612	267,894	316,017	620,835	1,108,642
Price/pound	$0.205	$0.263	$0.272	$0.256	$0.226	$0.146	$0.139
1948: [1]							
Pounds sold	672,053	439,680	236,582	344,552	568,140	1,136,811	2,034,804
Price/pound	$0.172	$0.168	$0.194	$0.187	$0.192	$0.155	$0.145
Pounds caught	602,142 (678,841)	395,448 (444,121)	233,327 (238,972)	335,862 (348,032)	534,758 (573,879)	999,302 (1,148,294)	2,038,345
1949:							
Pounds sold	68,413	116,327	120,615	235,465	1,016,826	2,255,535	1,690,860
Price/pound	$0.319	$0.261	$0.309	$0.304	$0.138	$0.119	$0.124
Pounds caught	68,683	116,625	121,717	236,392	1,020,457	2,260,284	1,696,565
1950:							
Pounds sold	154,562	141,213	186,494	399,497	579,600	982,714	1,942,838
Price/pound	$0.211	$0.204	$0.228	$0.190	$0.152	$0.140	$0.126
Pounds caught	157,066	141,932	187,740	400,973	581,851	985,410	1,948,585
1951: [2]							
Pounds sold	87,123	86,382	94,178	525,796	2,287,977	2,577,022	2,312,616
Price/pound	$0.238	$0.238	$0.379	$0.182	$0.132	$0.128	$0.127
Pounds caught	87,489	87,583	97,094	529,374	2,295,651	2,584,710	2,323,489
1952:							
Pounds sold	28,771	89,606	55,721	384,925	573,965	814,238	1,649,956
Price/pound	$0.276	$0.273	$0.352	$0.186	$0.165	$0.141	$0.133
Pounds caught	29,054	89,958	55,867	387,141	577,992	818,345	1,654,397
1953:							
Pounds sold	195,193	203,203	575,884	862,125	1,236,649	2,237,334	1,507,242
Price/pound	$0.248	$0.204	$0.148	$0.134	$0.128	$0.125	$0.125
Pounds caught	200,197	204,139	576,345	863,700	1,239,585	2,241,430	1,509,773
Weighted average price/pound	$0.211	$0.224	$0.226	$0.196	$0.160	$0.136	$0.137

Year	August	September	October	November	December	Total catch	Weighted average price/pound
1944:							
Pounds sold	59,233	99,016	123,744	33,921	62,359	734,012	
Price/pound	$0.254	$0.254	$0.259	$0.231	$0.278		$0.259
1945:							
Pounds sold	760,035	663,842	662,358	436,738	227,258	3,907,302	
Price/pound	$0.282	$0.275	$0.253	$0.255	$0.264		0.264
1946:							
Pounds sold	720,829	589,146	655,367	400,981	116,844	5,630,251	
Price/pound	$0.136	$0.147	$0.141	$0.237	$0.326		0.187
1947:							
Pounds sold	634,219	507,044	373,019	465,272	460,096	5,591,536	
Price/pound	$0.146	$0.145	$0.160	$0.178	$0.179		0.174
1948: [1]							
Pounds sold	1,290,683	878,024	422,843	234,227	78,552	8,336,951	
Price/pound	$0.144	$0.152	$0.175	$0.225	$0.253		0.162
Pounds caught	1,296,645	879,362	423,636	234,840	78,974	8,052,641 (8,383,941)	
1949:							
Pounds sold	2,421,441	1,035,291	490,509	255,122	157,605	9,864,009	
Price/pound	$0.121	$0.129	$0.153	$0.186	$0.178		0.138
Pounds caught	2,426,601	1,038,151	491,960	258,735	158,516	9,894,686	
1950:							
Pounds sold	1,801,779	1,174,012	1,020,678	706,048	391,867	9,481,302	
Price/pound	$0.136	$0.133	$0.134	$0.132	$0.153		0.142
Pounds caught	1,805,031	1,176,794	1,022,590	708,271	395,179	9,511,422	
1951: [2]							
Pounds sold	2,672,960	1,384,488	410,181	247,062	188,489	12,874,274	
Price/pound	$0.125	$0.117	$0.136	$0.164	$0.189		0.134
Pounds caught	2,683,270	1,387,647	411,595	248,094	190,313	12,926,309	
1952:							
Pounds sold	1,751,162	983,537	574,324	109,792	248,022	7,264,019	
Price/pound	$0.129	$0.134	$0.136	$0.202	$0.214		0.146
Pounds caught	1,758,153	986,554	575,603	110,138	248,649	7,291,851	
1953:							
Pounds sold	2,138,806	1,278,507	1,196,400	217,364	381,830	12,030,537	
Price/pound	$0.123	$0.129	$0.132	$0.161	$0.144		0.132
Pounds caught	2,142,181	1,281,278	1,199,164	218,077	383,537	12,059,406	
Weighted average price/pound	$0.138	$0.145	$0.157	$0.190	$0.194		0.154

[1] Summarized late reports for pounds caught not available for January through June 1948. Adjusted catches, in parentheses, based on weight sold; future references to total catches for 1948 will be based on these figures.

[2] Published monthly catch statistics changed from pounds sold to pounds caught in November 1951.

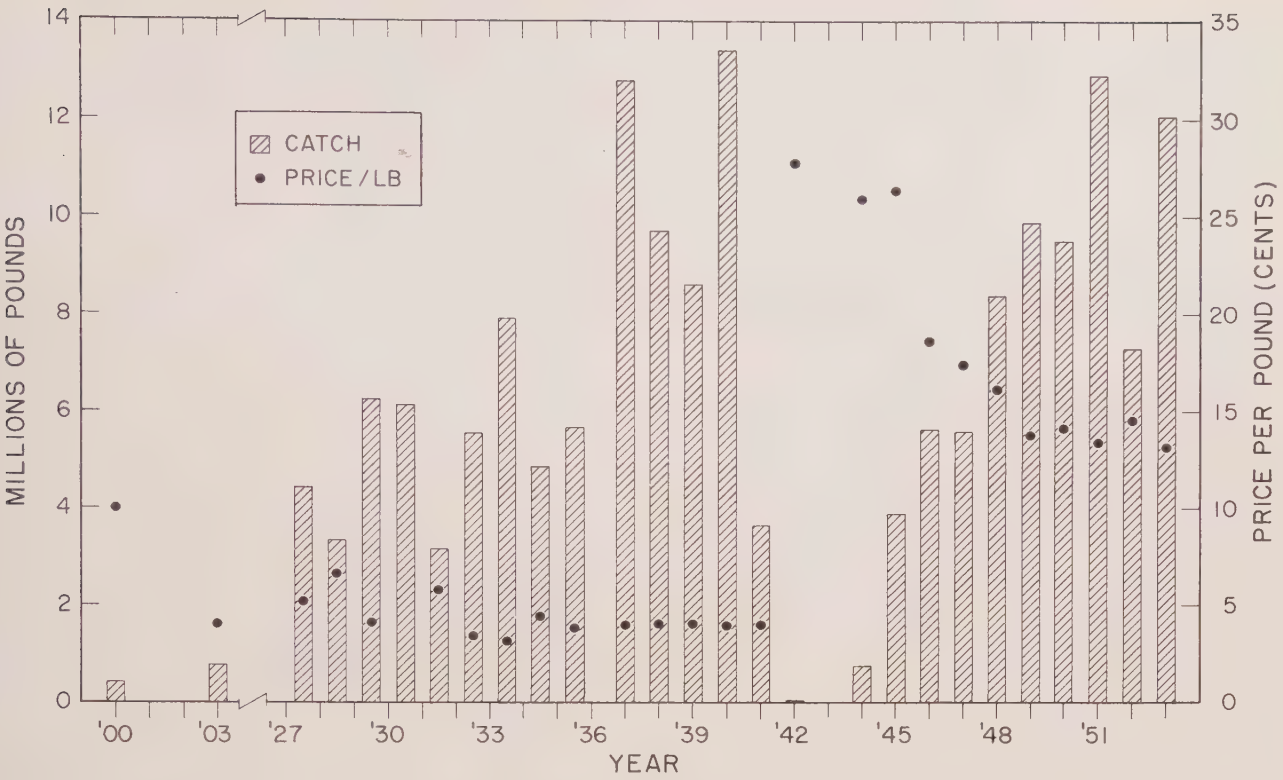


FIGURE 1.—Annual Hawaiian skipjack catch (weight sold) and price per pound for all available years, 1900–1953. The data for 1928–36 are by fiscal years (July to June); data for 1937–53 are by calendar years.

The number of boats (sampans) engaged in the local fishery has varied only slightly in recent years. There were 26 boats actively fishing for skipjack in 1953 as compared with 32 in 1948 (June 1951). This apparent decrease during the 5-year period may have resulted from a change in the interpretation of what constitutes a skipjack vessel. Many of the smaller craft that fish for skipjack on a part-time basis may not have been included in the 1953 records. Between 1948 and 1953 only 2 new sampans joined the fleet, but 2 of the older boats (not included in the total count) were wrecked and lost during 1953.

The size and design of the sampans are essentially as described by June (1951). The boats range from 58.3 to 80.5 feet in registered length and generally are of wooden construction—only two have steel hulls. All are equipped with diesel engines and are driven by a single screw. A major change in recent years has been the replacement of some of the older engines with new high-speed engines rated up to 450 horsepower. As fishing is usually done close to port and the catch is landed within a few hours of capture, the sampans do not have mechanical refrigeration systems but some carry ice. The basic specifications and distribution, by islands, of the 26 full-time skipjack boats operating in 1953 are given in appendix table 1, page 272.

The usual sequence of operations of a Hawaiian skipjack sampan is to catch bait on 1 or more days, depart for the fishing grounds early in the morning, fish, then return to port and unload the catch that night. If sufficient bait remains, the boat may depart the next day for the fishing grounds; if not, the operational sequence is repeated.

CATCH STATISTICS

Methods of Collection

The systematic collection of fishery statistics in Hawaii has evolved from occasional surveys through a stage of regular but relatively incomplete coverage to the present system, which endeavors to record the complete commercial production in the Territory.

The first statistics on the Hawaiian fishery, for 1900 and 1903, were believed to be complete by Cobb (1902, 1905), who collected them. In 1925,

the legislature enacted a law requiring catch reports of fish dealers in the ports of Honolulu and Hilo. These reports, estimated to be two-thirds to three-fourths complete (Hawaii Commissioners of Agriculture and Forestry, 1946), were used in the compiling of the 1928 to 1942 catch records. It is probable that even after this legislation the reporting of catch data was still somewhat erratic, and that in the late 1920's and early 1930's the portion of the total catch reported may have been even smaller than this estimate.

In 1945 the 1925 law was amended to require catch reports from all fish dealers in the Territory; furthermore, a new law enacted in the same year required all owners or agents of licensed fishing craft to report their catches. Although this amendment was not passed until 1945, fish catch statistics from the major islands have been available since 1943. However, the catches for the period January 1943 through February 1944 were reported only in terms of the combined weight of all species landed.

The skipjack-catch report form has gone through a number of revisions since its introduction in March 1944. The initial form applied to all types of fishing on a monthly basis, whereas the present form provides for detailed information on individual fishing trips and is issued for skipjack reporting only (see appendix figs. 1–5, pp. 273-277). The catch statistics were compiled manually until 1947, when the punch-card method using IBM machines was introduced. This change has resulted in the preparation of more complete skipjack statistics since 1948.

In addition to the regular catch reports, interviews on 2 or 3 days a week with captains of the sampans were started in July 1949 (see appendix fig. 6, for a sample of the interview form). These interviews have been continued, during the summer months primarily, in order to obtain a better estimate of the catch per unit of effort of both skipjack and bait. The system was further modified in June 1953 by placing interview sheets on boats with the more cooperative captains who agreed to fill them in routinely. These sheets are collected and checked for additional information.

Completeness and Accuracy

It is apparent from the review of collection methods that the statistics for the Hawaiian skipjack fishery have been collected in a variety of ways and with varying degrees of completeness and accuracy. An evaluation of the more recent catch statistics requires consideration both of the routine followed in the fishery (p. 255) and of the methods by which the statistics are reported.

The skipjack are sold to the cannery on a weight basis, and it is the responsibility of the fishermen or their agents to report the exact weight sold and the price received, together with an estimate of the total weight and number of skipjack caught. The total weight caught must be estimated, since the fish used for home consumption are usually not weighed, nor are those fish weighed that spoiled before they reached the cannery. As the amount caught totals only about 1 percent more than the weight sold, errors in the estimate of total weight are relatively unimportant. The number of fish caught is calculated from an estimate of the average weight of the fish and the total weight of the catch. These reports are required of all persons possessing commercial fishing licenses; however, reports are required only for productive trips.

An important source of error in the catch statistics results from the occasional failure of fishermen to report their catches. An estimate of the unreported catches has been derived from a comparison of interview records and catch reports for 1952. The unproductive trips, which are often reported in the interview records but are not included in the catch reports, have been omitted from this analysis.

To evaluate the accuracy of the skipjack catch records, the extent of agreement between the interview records and the catch reports was determined by comparing the dates and sizes of skipjack catches and the dates and sizes of the bait-fish catches in each. The localities of catch for skipjack and bait were occasionally used as criteria of agreement. Bait-catch localities were usually in agreement in the two sets of reports, but oftentimes discrepancies arose in the reporting of the localities of skipjack catches (see p. 258). Based on the extent of agreement between them, the interview and the catch records were classified into five categories.

The first category is that in which an interview record matches a catch report for a given catch. An interview record was considered to match a catch report when (1) the date of catch as determined by interview was not more than 2 days before the reported date of landing; (2) the bait

catch given in the interview was made on the same day, in the same locality, and in about the same quantity as in the catch report; and (3) the estimated catch in the interview was within 75 percent of the reported catch.

The second category, in which more than 1 day's catch as determined by interviews is included in a single catch report, occurred occasionally when skipjack were caught on successive days without rebaiting. Reports falling in this category were recognized by (1) agreement in size and location of bait catch; (2) agreement (within 75 percent) between the sum of two or more consecutive interview estimates of skipjack catches and the total in the catch report; and (3) correspondence in date (within 2 days) between the last interview and the catch report.

The third category, in which catches listed in catch reports are much higher than those listed in the interview records, occurred in a few instances. Such catches were regarded as suspiciously high if the catches from individual trips of other boats operating during the same period of time were known to be small. In these instances it is believed that the catches shown on the interview records were combined into one catch report with other catches not covered by interviews. The part of the catch probably corresponding to that estimated in the interview was calculated by applying the ratio of weighed to estimated catch for the appropriate month (table 3, col. 8).

The fourth category includes interview records that were definitely not included in the catch reports. They were recognized when a check of all catch reports precluded the possibility of placing them in any one of the first three categories.

The fifth category includes the few instances in which the catch reported is not within 75 percent of the estimated catch from interviews and there is no evidence that would permit classifying the catch reports as category 3. Only 2.8 percent of the reports fell in this category, and these interview and catch records were eliminated from further consideration. Categories 3 and 5 were differentiated by determining whether the catch reports could have included catches not covered by the interview records. If there was any possibility, judging by the available records, of additional catches having been included in the catch report, the reports were placed in category 3.

From the comparison of catch reports and interview records the percentage of trips and the percentage of catch reported have been estimated for these different categories and are summarized in table 3. The trips for which there were interviews, exclusive of unproductive trips and those falling in category 5, have been listed in column 1. Column 2 lists the catches reported separately (category 1), and column 3 the catches reported in combined form (categories 2 and 3). Column 4 shows the percentage of trips reported

TABLE 3.—*Comparison of interview records and catch reports for the Hawaiian skipjack* (Katsuwonus pelamis) *fishery, 1952*

Month	Trips					Catch (in pounds)						
	1	2	3	4	5	6	7	8	9	10	11	12
	Number of trips interviewed [1]	Catch reports, category 1	Catch reports, categories 2 and 3	Percent of trips separately reported	Percent of all trips reported	Estimated catch shown on interview record, category 1	Weighed catch shown on catch report, category 1	Ratio of weighed/estimated catch	Catch shown on interview records, categories 1, 2, 3, and 4	Computed catch all trips interviewed [2]	Catch shown on catch reports, categories, 1, 2, 3, and 4	Percent of catch reported [3]
May	7	5	0	71.4	71.4	20,800	21,489	1.033	25,100	25,928	21,489	82.9
June	26	22	0	84.6	84.6	98,200	104,179	1.061	101,400	107,585	104,179	96.8
July	39	24	6	61.5	76.9	98,500	103,522	1.051	155,090	163,000	145,086	89.0
August	50	36	11	72.0	94.0	313,600	321,674	1.026	409,400	420,044	403,354	96.0
September	40	32	6	80.0	95.0	201,720	219,585	1.089	238,870	260,129	251,080	96.5
October	40	28	7	70.0	87.5	76,850	81,526	1.061	99,450	105,516	92,654	87.8
November	7	4	2	57.1	85.7	9,000	10,873	1.208	11,500	13,892	12,379	89.1
Total	209	151	32			818,670	862,848		1,040,810	1,097,014	1,030,221	
Average				72.2	87.6			1.054				93.9

[1] Exclusive of unproductive trips and category 5.
[2] Column 8×column 9.
[3] Column 11÷column 10.

separately and column 5 the percentage of trips reported both separately and in combined form. On the average, 87.6 percent of the trips recorded by interview were reported in the catch reports; only 72.2 percent were reported as separate trips.

In order to estimate the total catch from the reported catch, it was necessary first to establish the relation between the fisherman's estimate of his catch and the true weight of the catch (table 3, cols. 6, 7, and 8). The results show that the weighed catch averages 1.054 times the estimated catch reported in the interview records since the tendency of the fishermen is to underestimate their catch. The total catch estimated by the fishermen in all interviews (col. 9) has been multiplied by the monthly ratios (col. 8) to obtain a computed total catch that should have been reported for all trips covered by interviews (col. 10). Column 11 includes the total catch from all catch reports that correspond to the interviews (col. 9). The percentage of catch reported (col. 12) averaged 93.9 percent of the probable total catch. This value is somewhat higher than that for percentage of trips reported (87.6 percent), and suggests that the fishermen tended to overlook the small catches in their catch reports. If it is assumed that the percentage by weight reported has been constant for the years 1945 to 1953, then the total annual catch may be estimated as shown in table 4.

A peak catch of 13.7 million pounds was estimated for 1951. If we assume that the prewar peak of 1940 was only three-fourths complete and actually totaled 17.9 million pounds instead of the reported 13.4 million, then the fishery has yet to attain the level of the prewar catches.

TABLE 4.—*Reported and estimated annual skipjack catch, 1937–53*

Year [1]	Reported catch (pounds) [2]	Estimated catch (millions of pounds)
1937	12,787,261	17.0
1938	9,722,150	13.0
1939	8,604,768	11.5
1940	13,420,333	17.9
1945	3,907,302	4.6
1946	5,630,251	6.0
1947	5,591,536	6.0
1948	8,336,951	8.9
1949	9,864,009	10.5
1950	9,481,302	10.1
1951	12,874,274	13.7
1952	7,264,019	7.7
1953	12,030,537	12.8

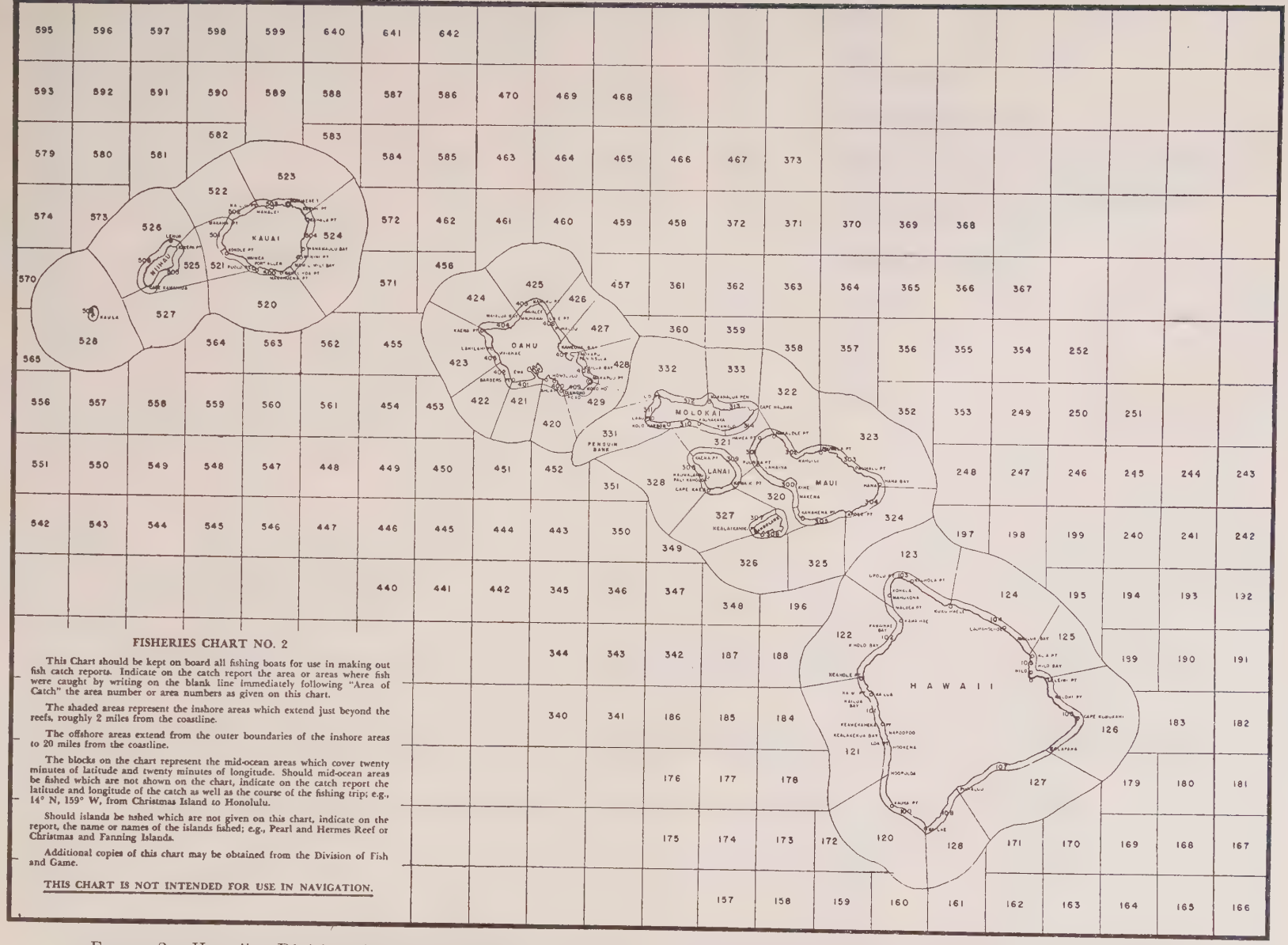
[1] Reports assumed to be 75 percent complete for years 1937–40 (Hawaii Commissioners of Agriculture and Forestry, 1946) and 93.9 percent complete for 1945–53. No adequate data available for the war years, 1941–44.
[2] Based on weight sold, from Hawaiian Division of Fish and Game records.

Another questionable aspect of the catch records is related to the reporting of the localities in which the catches were made. In the interviews the location was given by distance and direction from some reference point on land, and in the catch reports the location was identified by an area number as shown in fisheries chart No. 2 supplied by the Hawaiian Division of Fish and Game (fig. 2). Although the method of reporting differed between the interviews and the catch reports, gross disagreements in catch localities were readily detected by comparing corresponding reports from the two sources.

With reference to the designated fishing locality, interview records and catch reports were separated into two groups: those showing agreement as to catch locality and those not showing agreement as to catch locality. The reports were considered in agreement if there was general correspondence as to location and distance of the catch from a reference point on land. In spite of rather liberal treatment, the number in agreement was only about 45 percent; in many cases the same catch was reported from opposite ends of an island or even from different islands. Thus, assuming that the true catch locality was given when the two reports were in agreement, and that a fictitious locality was given when there was disagreement between the reports, less than one-half of all reports show the true source of the catch. Hence, any short-term study (within a year) on the localities of skipjack catch should be made in terms of general rather than specific areas if results are to be of value. However, errors in the comparison of specific areas over a period of years should be less important.

Value and Weight of the Landings

The price received by fishermen for skipjack for many years before World War II was about 4 cents a pound, but it jumped to 28 cents when landings were seriously curtailed by the war. The increase in landings after the war was accompanied by a decrease in price, which in 1949 leveled off at about 14 cents a pound (table 2). This is an average of the price paid by the cannery, about 12 cents, and the higher prices received in the fresh fish market, particularly in seasons of low landings. The gross annual receipts to the fishermen were about a million dollars or more from 1945 on and reached a peak of $1.7 million in 1951.



FISHERIES CHART NO. 2

This Chart should be kept on board all fishing boats for use in making out fish catch reports. Indicate on the catch report the area or areas where fish were caught by writing on the blank line immediately following "Area of Catch" the area number or area numbers as given on this chart.

The shaded areas represent the inshore areas which extend just beyond the reefs, roughly 2 miles from the coastline.

The offshore areas extend from the outer boundaries of the inshore areas to 20 miles from the coastline.

The blocks on the chart represent the mid-ocean areas which cover twenty minutes of latitude and twenty minutes of longitude. Should mid-ocean areas be fished which are not shown on the chart, indicate on the catch report the latitude and longitude of the catch as well as the course of the fishing trip; e.g., 14° N, 159° W, from Christmas Island to Honolulu.

Should islands be fished which are not given on this chart, indicate on the report, the name or names of the islands fished; e.g., Pearl and Hermes Reef or Christmas and Fanning Islands.

Additional copies of this chart may be obtained from the Division of Fish and Game.

THIS CHART IS NOT INTENDED FOR USE IN NAVIGATION.

FIGURE 2.—Hawaiian Division of Fish and Game fisheries chart No. 2, showing the statistical areas established for Hawaiian waters.

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From 1928 through 1936 the catch totals were summarized only by fiscal years, but in subsequent years they are available for calendar and fiscal years. In some years the published reports do not designate whether the fish went to the market or to the cannery. In fiscal year 1936, the cannery reported its purchases for the period January through June 1936, but not for July through December 1935. The 1941 catch was low, partly because of the curtailment of fishing resulting from prewar naval maneuvers and wartime restrictions and partly because of the failure of some of the boats to operate during the first 6 months of the year owing to a controversy over the price of fish. None of these factors were serious enough to have distorted the general trend of increasing landings during the period ending in 1940.

Because of a change in the method of collecting data on the skipjack fishery, the postwar (World War II) catch statistics are much more complete than the records from 1928 through 1942. Some variations occur in the published figures, however, because from March 1944 to October 1951 the skipjack catch statistics were published in terms of weight sold, and in November 1951 this was changed to weight caught. Table 2 provides a comparison of the amount caught and the amount sold for the years 1948 to 1953 as compiled from both published and unpublished records of the Hawaiian Division of Fish and Game.

These statistics show an upward trend in the catch from 1944 to 1951, which appears to have been due partly to a changing fleet and partly to a change in relative abundance or availability of skipjack. There was a gradual increase in the number of vessels in operation from 1944 until the beginning of 1947, when about 26 vessels were engaged in full-time skipjack fishing. However, 10 of these sampans did not fish during the first 6 months of 1947 because of a disagreement over prices, and thus the first full year of fishing was 1948. The number of vessels in the fleet has remained nearly constant since the beginning of 1948.

Seasonal Variations in the Catch

The exploitation of skipjack in Hawaiian waters is highly seasonal and the bulk of the catch is landed during the months of May, June, July, August, and September (table 2). The average monthly landings reported for the years 1948 to 1953 are shown in figure 3. The reasons for this large seasonal influx of skipjack into the fishery remain obscure, but food and spawning may influence the movement into the fishery.

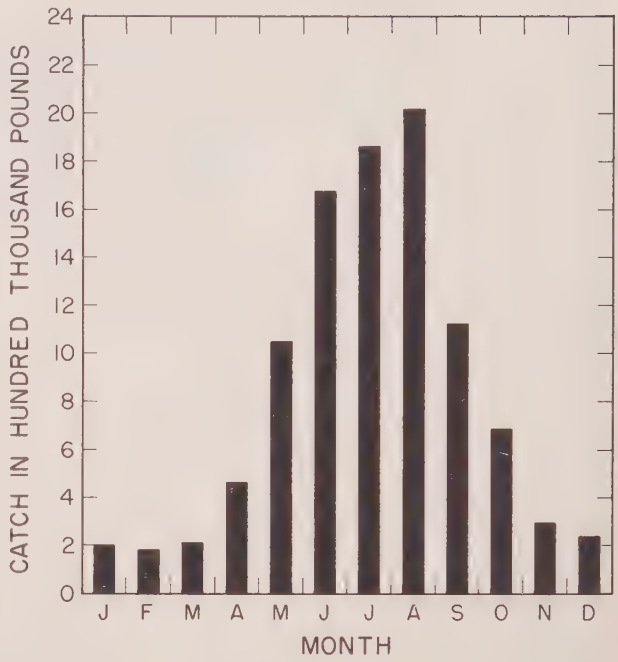

FIGURE 3.—Average monthly skipjack catch, 1948–53, based on records of the Hawaiian Division of Fish and Game.

King and Hida (1954) found that slightly more plankton, and consequently more tuna food, occurs in Hawaiian waters during the summer than in winter. It does not appear plausible, however, that a slight change in the food supply could cause such a marked seasonal fluctuation in the skipjack catch.

On the other hand, fishes are known to undertake long migrations in response to the spawning urge. From an examination of skipjack ovaries in different months of the year, Brock (1954) found indications "that the spawning period probably extended from late February, March, or April to the first part of September," coincidental with the months of high skipjack landings. He also noticed that the fully ripe or spent fish were rarely found in the catches, indicating that they may be unavailable to the fishery when in this condition, and he found evidence that individual fish spawn repeatedly during one spawning season.

POFI investigations on larval tunas (Matsumoto 1958) support Brock's conclusion that skip-

jack spawn during the summer. Matsumoto found that in plankton samples obtained in August, during a cruise in Hawaiian waters, 164 of the 326 identified tuna larvae were skipjack. The dominant size group was less than 6 mm. in length, indicating that spawning could not have been far off either in time or space.

Experiences of skipjack fishermen with spawning fish are also of interest. They have observed that "spawning schools," encountered infrequently during the height of the season, are never fished successfully and, hence, are abandoned for more readily biting schools. The schools are considered to be spawning because they are often seen in a cloud of what is thought to be milt in the water.

If the seasonal abundance of skipjack in the Hawaiian fishery is attributed to a spawning migration, the actual biological or oceanographic conditions causing this movement are not evident at the present time.

Size and Number of Fish in the Catch

The average weight and total number of skipjack caught (table 5) were computed from the catch records for each month from 1948 through 1953. A comparison of the data for those years showed that skipjack were taken in the greatest numbers and that the fish had the highest average weights during the 2 best years, 1951 and 1953 (fig. 4). The variation in number of fish landed between the fair years of 1949 and 1950 and the poor year of 1952 is relatively less than the variation in the total weight of fish landed, suggesting that skipjack may have been equally abundant during these years and that the difference in total catch was largely due to differences in the size of the fish.

The success of fishing, and with it the magnitude of the total catch in weight, is controlled, other things being equal, by a combination of two factors: the absolute numbers of fish available and the size of the fish. The good catches of 1951 and 1953 were due to the presence of large numbers of large fish, whereas the 1952 catch was poor because the skipjack were both few and small. A lesser abundance of fish may be compensated for within limits by the presence of larger fish, e. g., the third largest catch in weight, for the years under consideration, was recorded in 1949, but this year ranked last in the total number of

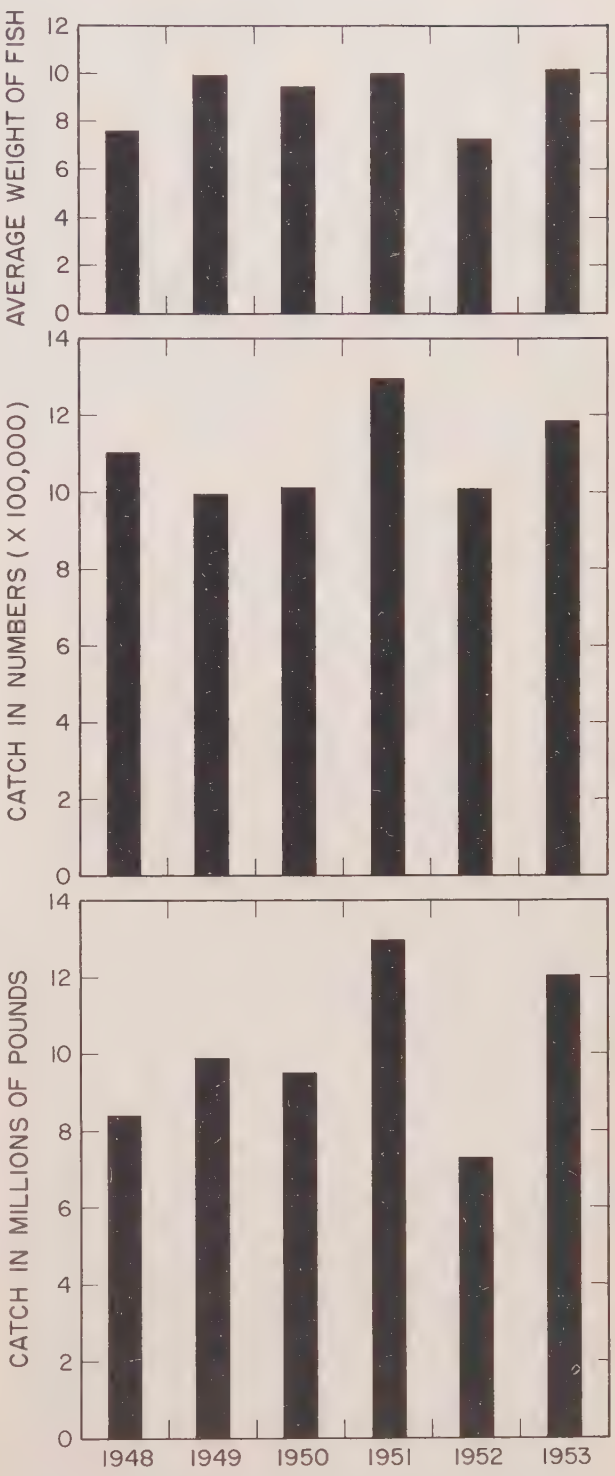

FIGURE 4.—Skipjack catch by average weight and number of fish taken and total catch, 1948–53, based on records of the Hawaiian Division of Fish and Game.

TABLE 5.—*Number and average weight of skipjack landings, by month and year, 1948–53*

[From Hawaiian Division of Fish and Game records; weight in pounds]

Month	1948		1949		1950		1951		1952		1953		Weighted average—	
	Number landed	Average weight	Number landed	Average weight	Number landed	Average weight	Number landed	Average weight	Number landed	Average weight	Number landed	Average weight	Number landed	Weight
January	[1] 66, 384	10. 226	10, 562	6. 503	27, 344	5. 744	11, 916	7. 342	4, 233	6. 863	14, 902	13. 434	24, 372	9. 024
February	[1] 43, 851	10. 128	14, 121	8. 259	21, 115	6. 722	8, 680	10. 090	11, 527	7. 804	26, 142	7. 809	21, 341	8. 645
March	[1] 56, 454	4. 233	15, 921	7. 645	39, 350	4. 771	15, 281	6. 354	7, 963	7. 016	55, 831	10. 323	31, 672	6. 697
April	[1] 78, 705	4. 422	36, 446	6. 486	53, 179	7. 540	61, 879	8. 555	58, 782	6. 586	105, 278	8. 204	66, 174	7. 014
May	[1] 84, 295	6. 808	93, 758	10. 884	80, 757	7. 205	160, 625	14. 292	82, 230	7. 029	128, 414	9. 653	112, 570	9. 982
June	[1] 224, 583	5. 113	160, 897	14. 048	105, 912	9. 304	198, 916	12. 994	101, 230	8. 084	157, 238	14. 255	157, 348	10. 580
July	199, 897	10. 197	136, 194	12. 457	117, 832	16. 537	360, 622	6. 443	224, 538	7. 368	190, 580	7. 922	183, 362	9. 085
August	130, 029	9. 972	225, 793	10. 747	159, 610	11. 309	232, 177	11. 557	269, 325	6. 528	190, 823	11. 226	197, 458	10. 028
September	128, 336	6. 852	137, 997	7. 523	191, 629	6. 141	129, 978	10. 676	113, 934	8. 659	137, 935	9. 289	137, 358	8. 037
October	49, 038	8. 639	92, 231	5. 334	100, 996	10. 125	61, 848	6. 655	93, 412	6. 162	106, 384	11. 272	85, 595	8. 185
November	30, 061	7. 812	46, 796	5. 529	59, 554	11. 893	32, 721	7. 582	14, 213	7. 749	22, 339	9. 762	35, 332	8. 645
December	10, 922	7. 231	23, 246	6. 819	51, 543	7. 667	22, 411	8. 492	25, 560	9. 728	50, 247	7. 633	30, 590	7. 912
Total number	1, 102, 555		993, 962		1, 008, 821		1, 297, 054		1, 006, 947		1, 186, 113		1, 083, 172	
Weighted average weight		7. 604		9. 955		9. 428		9. 966		7. 242		10. 167		9. 107

[1] Calculated from the adjusted total catch.

fish caught. Large catches in weight may also be obtained when large numbers of small fish are caught, however, the chances of a large catch in weight are far greater under the former condition, because the number of fish that can be caught with a given effort is somewhat independent of size for fish averaging less than 20 pounds. One report (Hawaii Commissioners of Agriculture and Forestry, 1952) states that the maximum efficiency can be realized in live-bait fishing by working skipjack schools that average between 15 to 20 pounds per fish. Fishing usually lasts 10 to 15 minutes for any one school or for a single pass at a school, hence a larger total weight can result from a "small number-larger size" combination than from a "large number-smaller size" combination.

Catch by Areas

The fishing of distant offshore grounds by the local fishery is restricted principally by the high bait mortality, the limited range of the sampans, and the lack of refrigeration for the catches. Of these three factors, live-bait mortality must be considered of primary importance. A 100-percent bait mortality even before reaching the fishing grounds is not an uncommon occurrence; consequently, much of the skipjack fishing is done close to the baiting areas.

The skipjack catch by areas, as reported by the fishermen for the years 1948 through 1953, was compiled according to the scheme of area designations used on fisheries chart No. 2 of the Hawaiian Division of Fish and Game (fig. 2). The analysis was made despite discrepancies in the reports of localities of catch, as discussed earlier, for it was felt that although there may be errors in the comparison between the small individual areas (20 square miles) within a year, the errors should be negligible over a number of years and between larger, combined areas.

The localities of capture were divided into 3 major zones: Inshore, within 2 miles of land; coastal, 2 to 20 miles; and offshore, beyond 20 miles. The major portion of the catch (about 75 percent) was caught in the coastal zone, as was shown by Royce and Otsu (1955), and the remaining 25 percent of the catch came almost entirely from the offshore zone; the inshore zone contributed an insignificant amount to the total annual catch (fig. 5).[1]

Examination of skipjack catches with respect to distance offshore shows that, except for 1952, catches from the coastal zone remained fairly constant for the years 1948 to 1953, and ranged from 5.3 million to 8 million pounds. Figure 5 suggests that a total of 8 million pounds per year may be the maximum catch that can be harvested from this zone with the present fishing intensity, as implied by the successful years of 1951 and 1953 when 7.7 million and 8.0 million pounds were caught. If this assumption is correct, any in-

[1] There are some discrepancies in the figures between the total catch and the totals of the three zones because of the rounding off of the catches into thousands of pounds and the omission of some catches from unidentified areas.

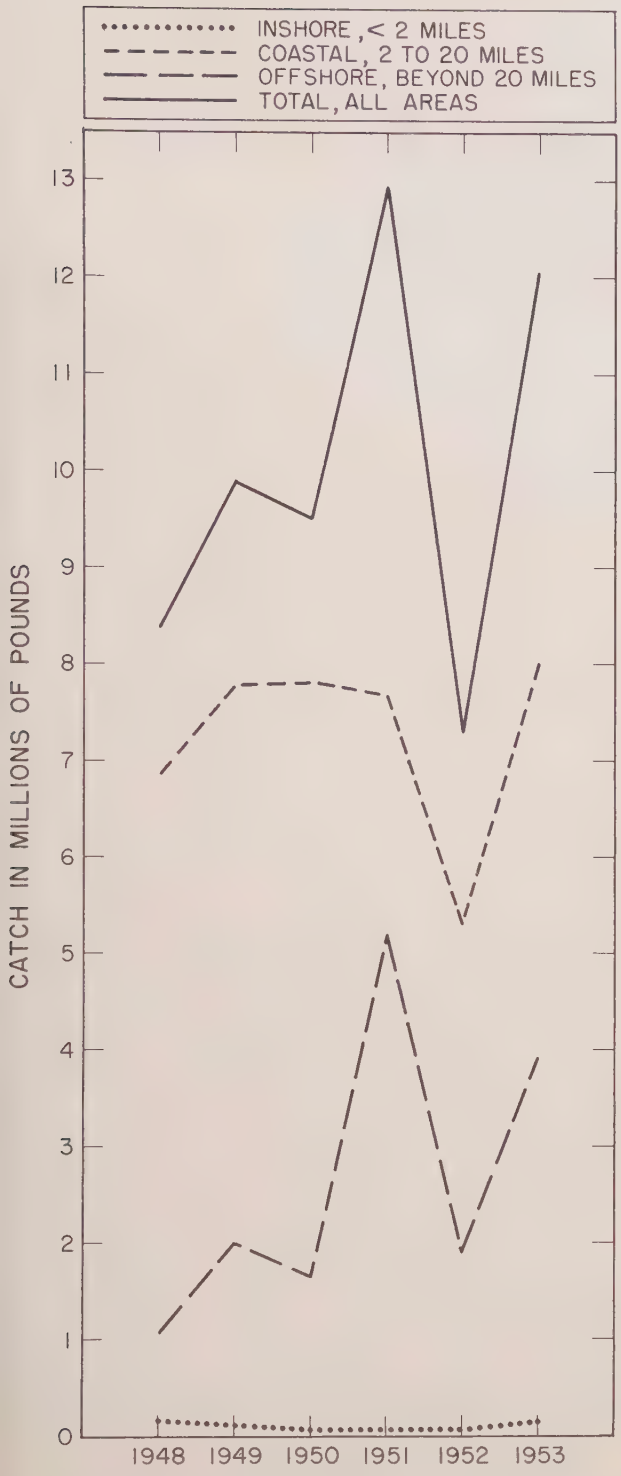

FIGURE 5.—Skipjack catch by zones and total catch from all areas.

crease in the total annual landings must come from increased catches in the offshore zone.

In general, catches from the offshore zone are closely correlated with the catches from all areas (fig. 5). In the record year of 1951, 40 percent of the total catch was taken in the more distant zone and in 1953, 32 percent, whereas during other years not more than 26 percent of the total catch was taken there.

About 90 percent of the annual catch from the offshore zone is obtained from areas between Oahu and Kauai (fig. 6, solid area) and around Oahu, Molokai, and Maui (fig. 6, hatched areas). This distribution of the catch is probably associated with the fact that the majority of the sampans in the fishing fleet are based on Oahu and Maui.

The offshore zone was subdivided into three major regions: Kauai Channel, Oahu-Molokai-Maui, and all other areas, in order to ascertain, if possible, which were the principal localities associated with the major fluctuations in annual catch (fig. 7). The total catch in the offshore zone closely parallels the catch from the region around Oahu-Molokai-Maui. Thus, it appears that the success of a fishing year depends to a large extent on the landings from this particular region.

According to the catch reports, the coastal zone around Oahu was the most productive in the Hawaiian fishery. The skipjack catch from each of the statistical areas (fig. 2, Nos. 420–429) within this zone have ranged from 99,000 to 1 million pounds per year. This apparent concentration of skipjack is probably related in part to the distribution of the fishing fleet on Oahu and in part to the location of the major baiting grounds.

An examination of all areas in the Hawaiian fishery averaging over 100,000 pounds of skipjack per year showed that (1) the best summer catches were made in areas 422 through 427, area 455 off Oahu, and area 125 off Hilo, Hawaii; (2) consistent catches without any pronounced increase during the summer months were made in areas 331, 332, 328, and 428 between Oahu and the Molokai-Lanai area, and area 122 off Kawaihae Bay, Hawaii; and (3) winter landings were relatively higher from the protected lee of the islands, especially areas 328 off Lanai, 423 off Waianae, Oahu, and 122 off Kawaihae Bay.

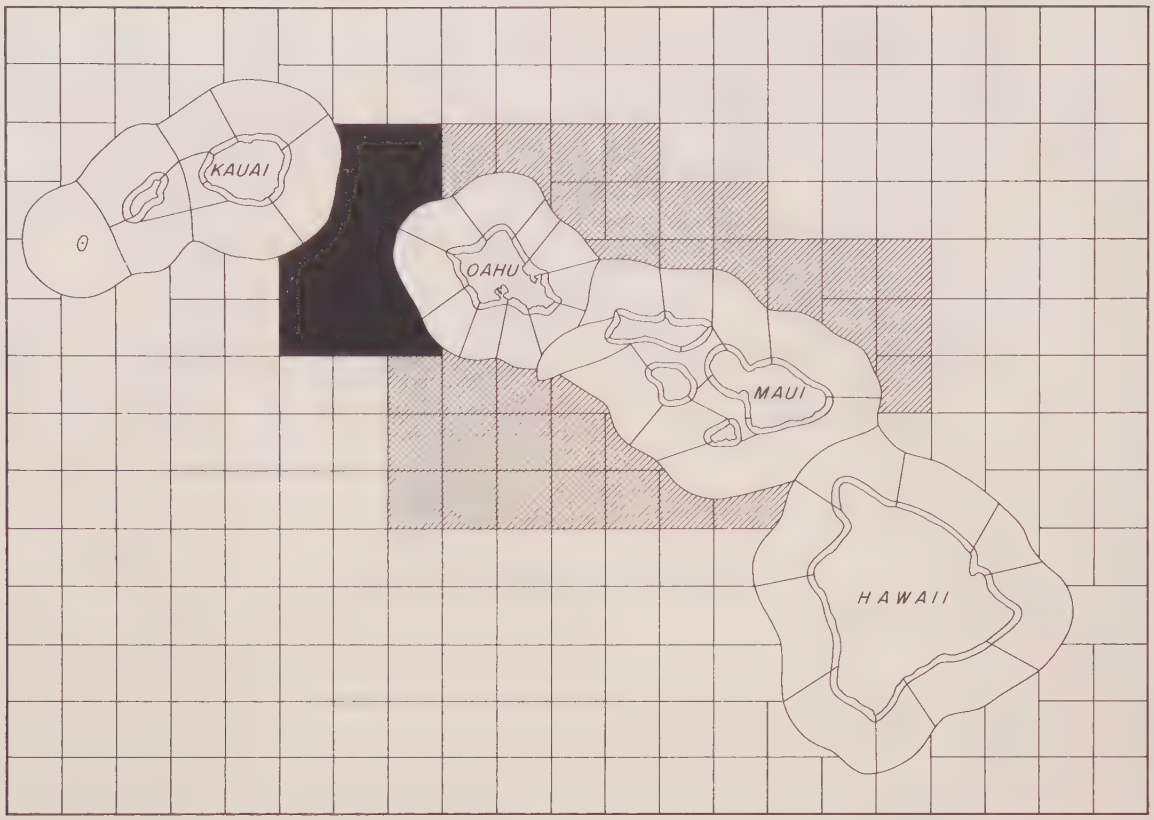

FIGURE 6.—The major offshore fishing zones between Oahu and Kauai (solid area) and around Oahu, Molokai, and Maui (hatched areas), Hawaiian Islands.

During the poor skipjack season of 1952, catches from the coastal zone showed a decline for Oahu and an increase for Kauai. The increase in the catch from Kauai, however, was insufficient to offset the drop in the catch from Oahu, resulting in a net decrease in the catch from all coastal zones. There was also a decrease in catch from the offshore zone, but the catch was still higher than the previous lows from the same zone for 1948 and 1950 when the annual landings amounted to 8.4 million and 9.5 million pounds, respectively, as compared with 7.3 million pounds for 1952. There were 3 productive areas (averaging over 400,000 pounds per year) during the poor year of 1952 that showed an increase in catch over the same areas for the best postwar year, 1951. These localities were all within 20 miles of land: area 125 off Hilo, and areas 331 and 328 southwest of Molokai and Lanai.

The region that shows the most promise of potentially greater productivity is in the offshore zone north of Oahu, Molokai, and Maui, but still within the range of the fishing fleet. The present catches are probably not indicative of the abundance of skipjack in these northern waters because of the low effort expended there, related to generally unfavorable weather conditions. The catch records over the 6-year period show good catches for 1 or 2 years, with no catch reported during other years. The areas to the south of Oahu (fig. 2, Nos. 351, 451–453) have shown evidence of increased production during the last 2 or 3 years.

With the type of vessel in use at present in the skipjack fishery, the most promising immediate prospect of increasing the catch is to exert more effort in the offshore zones, especially around Oahu, Molokai, Maui, and Lanai. The exploitation of these areas might be most feasible during the usual offseason period, when fish are not abundant in the coastal zones.

INDEX OF RELATIVE ABUNDANCE

A general measure of the catch per unit of effort in the skipjack fishery on an annual basis can best

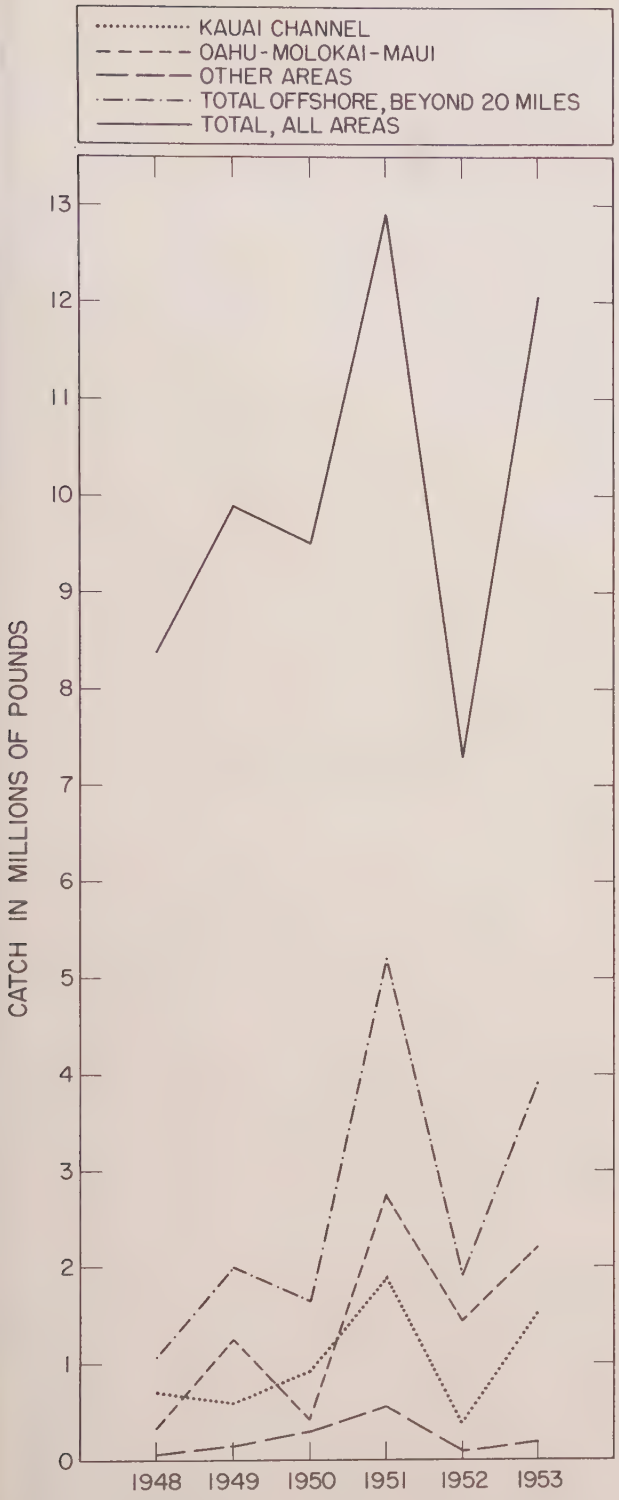

FIGURE 7.—Skipjack catch from the three major divisions of the offshore zone; from all areas beyond 20 miles; and the total catch from all areas: inshore, coastal, and offshore.

be obtained from the reports of the individual fishing trips turned in by the fishermen. A critical examination of the catch reports is necessary, however, to separate the effort expended in catching bait from the actual fishing effort.

In order to obtain some index of relative skipjack abundance, the average catch per productive fishing trip (1 day's fishing) was calculated for one sampan for a number of years and compared with the average catch for a number of other sampans for the same years. Unfortunately, as previously mentioned, the completely unproductive trips could not be accounted for in the analysis due to inadequate records.

Six sampans, A, B, C, D, E, and F, were originally selected for analysis on the basis of reliable catch reports turned in, as determined by comparison of catch and interview data. Two additional sampans, G and H, were included because their catch records showed that the number of trips reported was comparable to the number reported by the others, although their reports could not be verified for reliability, since no interview records were available. All of these vessels were based on Oahu and were representative of the local fishing fleet insofar as size of vessel was concerned.

The original catch records were examined for the years 1948 to 1953, and the average catch per trip was selected as the catch per unit of effort. The criterion used in the selection of the catches was agreement between bait-catch date and fish-landing date, both of which appear on each report sheet (appendix figs. 3 and 4, pp. 275-6). Catches used in this analysis were those in which (1) the landing date and bait-catch date were identical, (2) the landing date immediately followed a baiting date, or (3) the landing date immediately followed another landing date that was preceded by a baiting period during which bait was caught in sufficient quantities for two or three successive fishing trips.

A comparison of the skipjack catch of the selected vessels shows that, as expected, the best individual catches were made during the months of highest total catch for the fishery, and the larger vessels generally made the best catches (table 6). The relation between catches by boats and years, as shown by both the catch of individual boats and the average catch of the eight vessels (table 7), suggests a situation in the fishery different from

that indicated by the total landings. All of the selected vessels with the exception of one (G) enjoyed their most productive trips during 1951, but the catches of only four of the vessels (A, B, D, and H) showed that 1952 was an unusually poor year. Furthermore, even during the relatively good year of 1953, one of the boats (F) made its smallest catch of the period.

TABLE 6.—*Average catch of skipjack per trip of eight vessels, by season, 1948–53*

[Trip=1 day's fishing]

Vessel	Registered length (feet)	Average catch (in pounds) during—		
		Offseason [1]	Preseason and post-season [2]	Main season [3]
A	68	3,252	4,936	7,405
B	67	2,224	3,832	7,316
C	80	3,841	6,507	11,704
D	62	2,773	3,497	5,701
E	77	2,971	5,768	8,409
F	74	3,080	4,706	7,614
G	60	2,010	3,037	6,653
H	70	2,411	3,476	5,468

[1] January–March and November–December.
[2] April–May and September–October.
[3] June–August.

TABLE 7.—*Average catch of skipjack per trip of eight vessels, by years, 1948–53*

[Trip=1 day's fishing]

Vessel	Average catch (in pounds) in—						
	1948	1949	1950	1951	1952	1953	All years [1]
A	5,037	7,494	4,550	9,705	4,450	6,068	6,070
B	4,261	5,903	4,641	7,436	3,683	4,681	5,142
C	6,106	8,197	6,871	10,174	7,104	10,053	8,161
D	3,411	4,284	3,931	6,077	3,391	4,229	4,230
E	5,257	8,259	5,014	10,894	5,265	6,312	6,767
F		6,747	6,110	9,883	4,771	4,724	6,319
G	2,954	4,064	3,797	4,968	3,174	5,624	4,159
H	3,701	5,132	3,647	6,279	2,928	3,938	4,259
Average, all vessels [1]	4,393	6,235	4,878	8,348	4,440	5,788	5,696

[1] Based on total catches and corresponding number of trips.

The average skipjack catches of the eight vessels (based on a total of about 500 trips per year) were compared with the total annual landings (fig. 8), for the period 1948 to 1953. The chief difference between the two curves based on these data is the reversal in rank for the catches of 1949 and 1953. According to the catch-per-trip data, skipjack were in greater abundance in 1949 than in 1953; however, the records indicate a longer fishing season in 1953, and a corresponding larger catch that year. The total catch amounted to 12.1 million pounds in 1953, as compared with 9.9

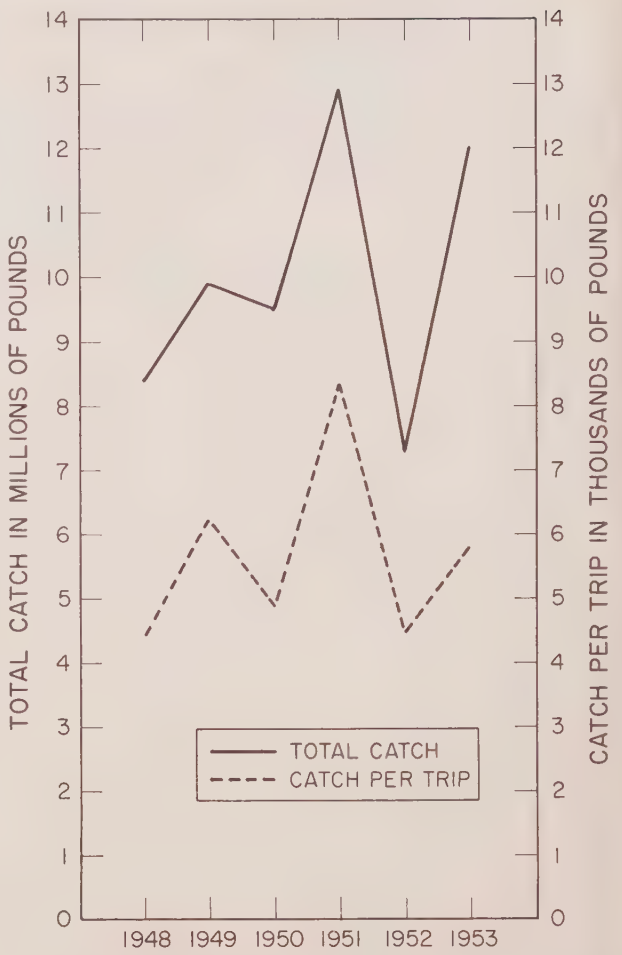

FIGURE 8.—Comparison between total annual landings and average catch per trip of eight sampans, 1948–53.

million pounds in 1949. Since the average weight of fish taken was about the same in both years, the relative abundance of skipjack may have been greater in 1949 than in 1953.

PREDICTING THE CATCH

An examination of the catch by months for the postwar years has produced some evidence of a correlation between the catch in certain early months of the year and in the main season. There is also an indication that the total catch of skipjack in any one year is associated with the size of the year-class 2 or 3 years earlier.

Employing a correlation analysis and the catch records (weight sold) for 8 years, 1946 to 1953,[2]

[2] 1946 and 1947 were not comparable with the more recent years with respect to the number of vessels in the fleet, and during 1953 a greater amount of effort was expended; nevertheless, the catch records for these years were included in this analysis to increase the number of observations.

the following comparisons were made: (1) First 3 months with remainder of the year, (2) April with May through September, (3) April with May through December, (4) April with the remaining 11 months (January to March and May to December) of the year, (5) first 6 months with last 6 months of the year, and (6) last 3 months (October to December) with the subsequent year. In all comparisons except the first, which gave a nonsignificant negative correlation, the results showed nonsignificant positive correlations. The highest correlation value ($r=0.667$, $P=$ca. 0.06) resulted from the comparison of catches for April and the remaining 11 months of the year; this apparent relation, admittedly tenuous, is worthy of closer study when more data are available.

Brock (1954, p. 95), in his analysis of skipjack length frequencies, states that,

> If it is assumed that these modal groups [40–50 cm., 68–72 cm., 79–80 cm.] represent year-classes, the following interpretation of the length frequency data may be made: At some age, perhaps 1 or 2 years, an age group or year-class is first taken in significant amounts by the fishermen during the summer fishing. By the second summer, this age group, at a length of 70 to 75 centimeters, is again taken and, as a matter of fact, is the size group most eagerly sought by the fishermen. This year-class appears again in the catch during the third summer but cannot be traced thereafter with any certainty from the available data.

The comparison between length frequencies of Hawaiian skipjack (Brock 1954, fig. 1) and the annual catch in weight indicates that larger catches are made when the greater percentage of the catch consists of the 68- to 72-cm. size group. Assuming that the seasonal abundance of skipjack in the local fishery is associated with spawning, and that the 68- to 72-cm. size fish are in their second or third year, the abundance of fish for every other year or every third year should be significantly correlated, neglecting, of course, the possibilities of catastrophic larval mortality and any oceanographic changes affecting the return of the spawning stock.

The correlation coefficient resulting from a test of the hypothesis that the annual catches of skipjack (1946–53) from every other year are positively related showed some correlation but was not statistically significant ($r=0.518$, $P>0.05$), and the comparison of the catches from every third year showed no correlation ($r=0.029$).

The possibility of making worthwhile predictions of seasonal or annual catches from preseason data seems doubtful at the present time, although it should be reexamined when a longer time series of catch data is available. The chief hope of prediction probably lies in relating fluctuations in the availability of skipjack with fluctuations in the physical, chemical, or biological properties of the environment.

THE BAIT FISHERY

The local skipjack fishery is primarily dependent on the live-bait supply, and the crew of a sampan may spend up to 50 percent of its time fishing for bait. Baiting, both day and night, may continue for 2 or 3 days before a sufficient supply can be accumulated for 1 day's fishing. Two species are of major importance in the local live-bait fishery: the anchovy or nehu, *Stolephorus purpureus* Fowler and the silverside or iao, *Pranesus insularum* (Jordan and Evermann). The nehu makes up about 92 percent of the catch; the iao most of the remainder. The postwar records show that the annual bait production has averaged about 36,000 buckets,[3] with a maximum of about 42,000 buckets caught under the present fishing intensity (table 8).

[3] A bucket is approximately equal to 7 pounds of fish.

TABLE 8.—*Bait-fish catch, by buckets, 1946–53*

[1 bucket=7 pounds of fish; data from Hawaiian Division of Fish and Game]

Locality	1946	1947	1948	1949	1950	1951	1952	1953
Anchovy (nehu):								
Oahu	16,728	21,690	23,868	27,246	22,360	18,646	14,744	21,470
Maui	6,804	5,448	10,974	7,344	[1] 10,066	[1] 9,537	[1] 6,056	[1] 8,890
Hawaii	1,410	1,470	3,708	2,664	1,671	3,292	3,103	3,718
Kauai	72	534	762	108	526	1,213	1,031	1,614
Molokai	204	150	468	288	738	582	602	76
Lanai	-	-	36	-	-	-	-	-
Other			24				10	36
Total	25,218	29,292	39,840	37,650	[1] 35,361	[1] 33,270	[1] 25,546	[1] 35,804
Other bait fish (all islands)	642	1,458	2,196	1,908	[1] 4,277	[1] 7,221	[1] 4,261	[1] 1,878
Grand total	25,860	30,750	42,036	39,558	[1] 39,638	[1] 40,491	[1] 29,807	[1] 37,682

[1] Adjusted bait catch (see pp. 268 and 269).

CATCH STATISTICS

Methods of Collection

Since July 1947 the method of reporting has been based on a system whereby the fishermen turn in a combined skipjack and bait report for each successful fishing trip (but not necessarily for each baiting operation), noting the following information on bait: Date of catch, locality, amount of bait caught, and amount used. These reports are edited, coded, and transferred to punch cards which are in turn transcribed to IBM summary sheets. Unlike the commercial fish catch, the bait catches are not published for circulation; therefore the annual catches by islands must be obtained from IBM record sheets or other summarized records. The interview records have also been a source of information concerning bait catches since July 1949.

Completeness and Accuracy

In order to estimate the proportion of the bait catch reported, an analysis similar to that made on the skipjack catch was followed by comparing interview records and catch reports (table 9). The procedure was slightly modified under the assumption that the catches as reported in the interview records were reasonably accurate (1) because the optimum capacity of the bait boxes was known, and (2) because of the close proximity of the bait-catch date to the interview date.

Interview records (table 9, col. 1) were first compared with corresponding catch reports (col. 2) to determine the accuracy of the catch reports (col. 3). All bait catches as reported in interview records (col. 4) were then checked against all reported catches (col. 5) in order to compute the percentage of the catch reported (col. 6). The reported catch included all the corresponding catches (col. 2) plus the few instances in which the amount of bait caught, as reported in the catch records, was not the original amount caught, but the amount left over from a previous trip. In such instances, the original amount caught was usually not reported, and errors such as this could be detected only by the comparison of interview records and catch reports. All duplicated or partially duplicated catches that could be recognized by an examination of a sequence of catch reports were omitted from this analysis.

Comparison of columns 3 and 6 in table 9 shows that the fishermen made a fairly accurate bait-catch report when they turned in the reports, but frequently they failed to make the bait reports. Analysis showed that each individual bait report may be 91 percent complete, but that only about 75 percent of the total catch was actually accounted for.

There were other irregularities, too. Examination of the summary records showed an apparent marked increase in bait catch reported for Maui waters from 1950 to 1953. This increase coincided with the introduction of a new record form during the summer of 1950. The new forms were very similar to the old except for the changing of the unit of bait measurement from box [4] to bucket (appendix figs. 3 and 4, pp. 275–6). Many of the bait catches from Maui during this period

[4] One box is equivalent to 6 buckets of bait.

TABLE 9.—*Comparison of interview records and catch reports for the bait fishery, 1952*

[Catch, by buckets]

Month	1 Bait catches shown on selected interview records	2 Bait catches shown on catch reports corresponding to interview records in col. 1	3 Percent of bait catch reported in catch reports	4 Bait catch shown on all interview records	5 Bait catch shown on all catch reports corresponding to interview records in col. 4	6 Percent of total catch reported
May	93.5	84.0	89.8	148.5	84.0	56.6
June	509.0	467.0	91.7	585.0	473.0	80.8
July	523.0	494.0	94.4	798.0	504.0	63.2
August	757.5	694.0	91.6	800.5	713.0	89.1
September	742.0	665.0	89.6	835.0	683.0	81.8
October	632.0	567.0	89.7	858.0	599.0	69.8
November	66.0	56.0	84.8	146.0	56.0	38.4
Total	3,323.0	3,027.0		4,171.0	3,112.0	
Average			91.1			74.6

were recorded on the old form, primarily because the Maui vessels were slow to change to the new form. It is believed, however, that most of the vessels, though they used the old form, actually recorded their catches in buckets in compliance with the new regulations. For instance, entries such as 25 boxes of bait for a fishing trip on a sampan with only 6 bait boxes were numerous during this period. However, if these statistics, as recorded in the IBM summary sheets, are converted to buckets (6 buckets per box) in order to make comparisons with recent years, the totals appear unreasonable.

For this study, all the bait caught from Maui waters during the period from 1950 through 1953 was considered in terms of buckets regardless of whether or not it was reported as boxes and regardless of the form used. This could lead to an underestimation of the catch, because some of the vessels may actually have meant boxes, particularly when using the old form. There is little possibility of this adjustment affecting that portion of the bait reported from Maui by non-Maui sampans (primarily those from Oahu), because they quickly adopted the new form. Some underestimation of the catches by Maui vessels must remain, but the general level of the catches they reported was usually larger than 6 (the number of bait boxes on board), suggesting that they were complying with the new regulations although using the old form.

BAITING AREAS

The distribution of bait catch by islands (table 8) shows that Oahu and Maui are the major sources of nehu, as averages of 64 and 25 percent, respectively, of the total catch were reported from these two islands. The important baiting grounds on Oahu are Kaneohe Bay, Pearl Harbor, and Honolulu Harbor, and the bulk of the catch comes from the first two localities. The catch from Pearl Harbor varies according to the extent of the restrictions placed upon the fishery by the United States Navy and is usually less than that taken from Kaneohe Bay. On Maui, about 86 percent of the nehu catch is obtained from Maalaea Bay and the Kihei region. The islands of Hawaii, Kauai, and Molokai contribute lesser amounts to the fishery, largely because of the limited extent of the baiting grounds.

On Oahu, the island supporting the most intensive bait fishery, the annual catch has fluctuated between 15,000 and 27,000 buckets during the period 1946 to 1953. The increase in the catch in 1947 (see table 8) may have been due in part to an increase in the number of sampans operating during the latter part of the year. The slight increase during the following year (1948) was also probably related to the larger number of boats in operation throughout the year. Since the number of vessels remained fairly constant after 1947, the years 1948 to 1953 may be considered comparable insofar as fishing effort for bait is concerned. The considerable increase in the 1949 bait catch may be attributed to the partial lifting of restrictions in Pearl Harbor, making more baiting grounds available to the fishermen. The island of Kauai has shown a general increase in bait catches compared to earlier years, and so has Molokai, except for the year 1953.

The fluctuation in the bait catch on the different islands, aside from availability and abundance, may be due in part to the geographical position of the major islands. The island of Hawaii with only two principal baiting grounds (Kawaihae-Kona region and Hilo Harbor) may be considered as a separate area, whose bait resources are utilized mainly by its own sampans. The islands of Kauai, Oahu, Molokai, and Maui may be grouped together because of the practices followed by the sampans based there. Sampans from Oahu, because of their central location, may bait in Kauai, Molokai, or Maui, as well as Oahu. The sampan stationed in Kauai, on the other hand, may bait in Kauai and Oahu but probably would not exploit the baiting grounds in the more distant island of Maui to any appreciable extent. Likewise, the boats from Maui may bait in Maui, Oahu, or Molokai but will do little baiting, if any, in Kauai, and although Maui is closer to Hawaii than to Oahu, the Maui sampans will favor Oahu because the opportunities of catching bait and possibly unloading their skipjack catches are better there than in Hawaii. Hence, the bait catch from the island of Hawaii has remained constant because of the more or less isolated nature of its fishery, whereas the catches from Kauai and Molokai may have been affected by the amount of effort directed to these islands, depending on the abundance of bait in the major baiting grounds of Oahu and Maui.

SIGNIFICANCE OF BAIT PRODUCTION

On the basis of the foregoing information on bait statistics and the analysis of the completeness of the reported catch, the maximum annual yield of bait may be reestimated to be closer to 50,000 or 60,000 buckets (table 10) than to the reported catch of 42,000. Since it has been found from previous studies that there is about 30 percent mortality of bait associated with the initial period of capture (Hawaii Commissioners of Agriculture and Forestry, 1952) and the reported amount of bait caught may be only 75 percent complete, the total annual bait catch as reported may be roughly comparable to the amount actually utilized in the fishery.

TABLE 10.—*Reported and estimated annual bait catch, 1946–53*

[Reports assumed to be 74.6 percent complete; in thousands of buckets]

Year	Reported catch	Estimated catch
1946	25.9	34.7
1947	30.8	41.3
1948	42.0	56.3
1949	39.6	53.1
1950	39.6	53.1
1951	40.5	54.3
1952	29.8	39.9
1953	37.7	50.5

TABLE 11.—*Relation between live-bait and skipjack catches, 1946–53*

[1 bucket=7 pounds of fish]

Year	Bait catch (buckets)	Skipjack (pounds)	
		Sold	Catch per bucket
1946	25,860	5,630,251	217.7
1947	30,750	5,591,536	181.8
1948	42,036	8,336,951	198.3
1949	39,558	9,864,009	249.4
1950	39,638	9,481,302	239.2
1951	40,491	12,874,274	318.0
1952	29,807	7,264,019	243.7
1953	37,682	12,030,537	319.3

The availability of bait may, in certain years, be a limiting factor in the skipjack fishery. A comparison of the annual bait and skipjack catches (table 11) shows that the catch of skipjack per bucket of bait was higher for 1951 and 1953 than for any of the other years. Apparently, these 2 years represented periods of maximum efficiency with respect to utilization of bait; furthermore, the interviews with fishermen indicated that bait was a limiting factor during these years. During 1947 and 1948, when bait efficiency was low, the amount of bait probably had little effect on production.

An evaluation of the effect of variations in the bait supply is difficult, however, because of numerous other factors affecting the annual skipjack landings. The fish may be equally abundant in different years, but their vulnerability due to biting readiness (slow or fast biting) may differ; thus, more bait may be needed to catch an equal amount of fish in one year than in another. Also, the fish may differ in size between years; thus, the predominance of smaller fish in the fishery would require the use of more bait to catch an equal weight of fish. But, regardless of the efficiency in the utilization of bait, the possibilities of obtaining larger skipjack catches at the present time are more favorable when more live bait is available. Brock [5] has discussed the monthly variations in the weight of skipjack caught per bucket of bait used, and showed that larger catches are obtained during the summer months, when the bulk of the annual catch is landed.

SUMMARY

1. All existing catch records of the Hawaiian skipjack fishery for the period 1900 to 1953 have been brought together in this report. The annual skipjack catch for the more recent years, 1948 to 1953, ranged from 7 million to 13 million pounds, and accounted for 50 to 70 percent by weight of all fish landed in the local commercial fishery.

2. Comparison of interview and catch records indicated that the 1945–53 skipjack catch statistics were approximately 94 percent complete.

3. Because of the variation in size composition of the catch, the apparent relative abundance of skipjack depends on whether the total weight or the total number of fish in the catch is used. In order of decreasing catch by weight, the years may be arranged as follows: 1951, 1953, 1949, 1950, 1948, and 1952. In terms of catch by number of fish, the order becomes 1951, 1953, 1948, 1950, 1952, and 1949.

4. Because of the convenience to the sampans of fishing close to home ports and to baiting grounds, about 75 percent of the skipjack catch

[5] Mimeographed statement "Explanation of tables and figures concerned with use of bait for the years 1950 to 1954," Hawaii Commissioners of Agriculture and Forestry, Division of Fish and Game, Honolulu.

during 1948 to 1953 was taken within 20 miles of land. The catch within this coastal zone has remained relatively constant from year to year (with the exception of 1952); large increases in the annual catch have been the result of increased catches from the offshore zone.

5. The average skipjack catch in weight per trip was used as a possible index of relative abundance and the catch in decreasing order may be arranged as follows: 1951, 1949, 1953, 1950, 1952, and 1948.

6. Attempted predictions of the yearly skipjack catch based on past catch statistics alone are of little value, partly because of the relative shortness of the period under observation. More reliable predictions may be possible in the future when the relation between fish stocks and environment can be ascertained.

7. The expansion of the Hawaiian skipjack fishery has been restricted primarily by the shortage of bait. The principal bait used is nehu (*Stolephorus purpureus*), an anchovy, and the main sources of supply are the inshore waters of Oahu and Maui.

8. An examination of interview records and catch reports indicated that only 75 percent of the total bait catch was reported. In view of the high bait mortality (about 30 percent), the reported bait catch, averaging about 36,000 buckets (252,000 pounds) a year, may be a close approximation of the amount actually used in fishing.

9. The skipjack catch per bucket of bait (7 pounds) ranged from a low of 182 pounds in 1947 to a high of 319 pounds in 1953.

10. Specifications of each full-time skipjack sampan in the Territory of Hawaii for 1953 are presented in the appendix to aid in evaluating future changes in catch that may be related to changes in vessel design.

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APPENDIX

In respect to information listed in the following table, the basic specifications of the full-time Hawaiian skipjack sampans fishing in 1953 were taken primarily from the files of the United States Customs, Marine Division, unless otherwise stated. The various registered measurements, as defined in Merchant Vessels of the United States (United States Treasury, 1952) are as follows:

Registered length "is the length measured on the top of the tonnage deck from the fore part of the outer planking or plating at the bow to the after part of the sternpost of screw steamers and to the after part of the rudderpost of other vessels. The registered length is not usually the same as the overall length nor the load-water-line length."

Registered breadth "is the breadth at its widest part measured from the outer side of the planking or plating on one side to the corresponding point on the opposite side."

Registered depth "is the depth measured from the inner side of the tonnage deck, amidships, to the bottom of the hold. The depth is not the draft of a vessel."

APPENDIX TABLE 1.—*Basic specifications of the full-time Hawaiian skipjack boats (sampans) fishing in 1953*

[All boats with single screw, diesel engine(s)]

Name of boat	Official number	Island	Tonnage		Registered dimensions			Type of hull	Date built	Number in crew	Engine	Horsepower	Bait boxes [1]		
			Gross	Net	Length (ft.)	Breadth (ft.)	Depth (ft.)						Number	Average effective volume (gal.)	Type of circulation
Amberjack	252808	Maui	61	41	70.0	16.0	7.3	Steel	1947	15	General Motors	330	6	1,085	Forced.
America Maru	231965	Oahu	54	33	71.5	14.8	8.8	Wood	1930	10	Gray Marine	330	6	685	Open flow.
Bluefin	238180	do	31	19	66.1	13.1	5.9	do	1927	10	do	225	6	558	Do.
Bonito	239892	do	37	19	67.7	13.8	6.7	do	1940	10	Atlas Imperial [2]	155	6	580	Do.
Broadbill	238206	do	36	11	66.8	12.8	6.0	do	1926	10	General Motors	300	6	614	Do.
Buccaneer	253735	do	68	40	69.4	16.9	7.8	Steel	1947	12	do	330	6	1,232	Forced.
Constance C	238251	do	44	21	60.5	13.2	7.2	Wood	1930	9	Gray Marine [2]	230	6	736	Open flow.
Corsair	257593	Hawaii	51	34	65.0	15.2	7.2	do	1949	12	Atlas Imperial	160	6	1,000	Do.
Darling Dot	254011	Oahu	77	52	80.5	16.9	6.8	do	1947	14	do	250	6	1,297	Do.
Dolphin	239501	Maui	33	17	66.8	12.7	7.3	do	1928	8	Gray Marine [2]	110	6	688	Do.
Electa	237448	Oahu	47	23	72.1	13.5	7.7	do	1938	11	Union	150	6	854	Do.
Helena II [3]	239190	Maui	29	13	65.8	12.3	6.2	do	1928	11	Gray Marine	225	6	575	Do.
Kiyo Maru [4]	238307	Oahu	27	18	58.3	11.8	5.6	do	1937	7	Union	150	6	600	Do.
Marlin	238043	do	44	18	70.0	13.5	5.9	do	1935	11	Caterpillar [2]	275	6	670	Do.
Maui Maru [5]	239364	Maui	29	14	67.3	13.0	5.7	do	1929	9	Gray Marine	165	6	577	Do.
Momi	238185	Oahu	31	15	61.9	12.5	5.5	do	1934	8	Caterpillar	115	6	574	Do.
Neptune	237230	do	46	20	71.5	13.6	6.6	do	1938	10	Atlas Imperial	250	6	839	Do.
Olympic	252822	Maui	38	25	66.8	14.5	6.0	do	1947	10	Gray Marine	450	6	708	Do.
Orion	251045	Oahu	51	23	76.6	16.2	6.7	do	1946	12	Caterpillar [3]	400	6	1,064	Do.
Sailfish	230892	do	51	35	74.4	15.1	6.5	do	1931	10	Atlas Imperial	160	6	1,135	Do.
Skipjack	238265	Hawaii	39	19	71.9	13.9	6.3	do	1928	11	Caterpillar [2]	165	6	785	Do.
Sooty Tern	253367	Maui	45	31	72.8	14.9	6.2	do	1947	13	Gray Marine [2]	330	6	1,127	Do.
S. T. Uruma [6]	252940	Oahu	47	32	72.3	15.7	5.1	do	1947	13	Atlas Imperial	250	6	891	Do.
Sunfish	238284	do	32	15	69.8	12.6	5.8	do	1926	10	Gray Marine [2]	225	6	664	Do.
Tradewind	260364	Kauai	54	34	72.6	15.5	7.3	do	1950	11	Atlas Imperial	200	6	873	Do.
Yellowfin	238314	Oahu	33	17	59.3	12.6	5.9	do	1928	10	Gray Marine	225	6	576	Do.

[1] From unpublished report "Measurements of bait tanks on Territory of Hawaii aku boats" by A. L. Tester, 1949.
[2] From files of the Hawaiian Division of Fish and Game.
[3] Changed to *Ooji* in 1954.
[4] Changed to *Holokahana II* in 1954.
[5] Changed to *Helena II* in 1955.
[6] Changed to *Kilohana* in 1954.

TERRITORY OF HAWAII
BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

MONTHLY STATEMENT OF FISH CATCH

(One copy must be filed for each boat operated)

Report for month of..... .....194.....Name of Operator.....

Commercial ☐ Address .....

Sport - - ☐ .....

License No..... Approx. No. of Hours Boat was Operated:.....

Boat F. G. No..... Gallons of Gasoline Used in Boats:.....

Gallons of Gasoline Used in Motor Vehicles:.....

DESCRIPTION OF BOAT

Type	Motor Inboard	Motor Outboard	Horse Power	Length	Beam	Draft

DISTRICT WHERE FISH CAUGHT:..... ....

Variety	Weight Caught	No. Lbs. Sold	Price Per Lb.	Total Money Rec'd	Variety	Weight Caught	No. Lbs. Sold	Price Per Lb.	Total Money Rec'd
Ahi					Ulua				
Aku					Weke				
Akule or Hahalalu					Lobster				
A'u					Crabs				
Mahimahi					Opihi				
Moi					Squid				
Sea Mullet					Turtle				
Pond Mullet					Others (List Below)				
Opakapaka									
Opelu									
TOTAL					TOTAL				

The above statement is true and correct to the best of my knowledge.

Date:..... ... .

... ...
(Signature)

Witness: .....
(Game Warden)

District: .....

APPENDIX FIGURE 1.—Fish-catch report form; introduced in March 1944 as standard form for reporting all types of fishing.

DIVISION OF FISH AND GAME

FISH CATCH REPORT

Sheet No..... Date..... .....19.....

Name of Licensee..... Lic. No.....

Name of Boat..... F. and G. No.....

Area of Catch..... Fishing Gear.....

(SEE ZONE MAP)

	SPECIES CAUGHT	NO. CAUGHT	LBS. CAUGHT	LBS. SOLD	VALUE
TUNAS	Aku				
	Ahi				
	Ahipalaha				
	Bluefin				
	Big Eye				
	Kawakawa				
A'U	Striped				
	Black				
	Broadbill				
	Au Lepe				
	Mahimahi				
	Ono				
	Hapuupuu				
	Kahala				
	Kalekale				
	Omilu				
	Opakapaka				
	Uku				
	Ulaula				
	Ulua				
	Weke-ula				
	Awa				
	Akule				
	Hahalalu				
	Amaama (Sea)				
	Kala				
	Kumu				
	Moi				
	Oio				
	Papai				
	Ula				
	Weke				
	Opelu				
	Iheihe				

BAIT FISH	NEHU	IAO	OTHERS	OPELU (KAAU)
No. of Boxes				
Area Taken				

The above statement is true and correct to the best of my knowledge.

Signature..... District:.....

THIS COPY FOR DIVISION OF FISH AND GAME

APPENDIX FIGURE 2.—Fish-catch report form; introduced in July 1945 as standard form for reporting all types of fishing.

TERRITORY OF HAWAII
BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
DIVISION OF FISH AND GAME

FISH CATCH REPORT

Name of Licensee..... License No.....

Name of Boat..... FG No.....

Type of Fishing..... Fishing Gear.....

FORM C-1 S-B 81645-200 BKS-3-49

Area of Catch..... Date of Landing..... ..... 19.....
(See Fisheries Chart No. 2) Mo. Day

	SPECIES CAUGHT		No. CAUGHT	LBS. CAUGHT	LBS. SOLD	VALUE*
TUNAS 001	Aku (Skipjack)	002				
	Ahi (Yellowfin) (Shibi)	003				
	Ahipalaha (Albacore) (Tombo-shibi)	004				
	Bluefin	005				
	Big-eyed (Menpachi-shibi)	006				
	Kawakawa	007				
SWORD-FISHES (A'U) 008	Striped Marlin	009				
	Black Marlin	010				
	Broadbill Swordfish	011				
	Au lepe (Sailfish)	012				
Mahimahi		013				
Ono		014				

BAIT REPORT

BAIT FISH		DATE TAKEN	LOCALITY TAKEN	QUANTITY TAKEN	QUANTITY USED
Nehu	01			boxes†	boxes†
Iao	02			boxes†	boxes†
Opelu	20			fish	fish
Sardines	07				pounds

* Value represents the amount of money received by the fisherman for total pounds of fish sold. Do not record price per pound.
† One box of livebait is approximately equivalent to 6 buckets of livebait.

The above reports are true, correct, and complete to the best of my knowledge and belief.

Signature..... Port of Landing.....
Licensee or Authorized Agent

Island.....

THIS COPY FOR DIVISION OF FISH AND GAME

APPENDIX FIGURE 3.—Fish-catch report form; introduced in July 1947 as standard form for reporting live-bait (skipjack) and flagline (longline) fishing.

TERRITORY OF HAWAII
BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
DIVISION OF FISH AND GAME

FISH CATCH REPORT

Name of Permittee..... Boat Permit No.....

Name of Boat..... FG No.....

Type of Fishing..... Fishing Gear.....

FORM C-1 S-B 93859 10M SETS-7-51

Area of Catch..... Date of Landing..... Mo. ..... Day ..... 19.....
(See Fisheries Chart No. 2)

	SPECIES CAUGHT		No. CAUGHT	LBS. CAUGHT	LBS. SOLD	VALUE*	
TUNAS 001	Aku (Skipjack)	002					
	Ahi (Yellowfin) (Shibi)	003					
	Ahipalaha (Albacore) (Tombo-shibi)	004					
	Japanese Bluefin (Black Tuna) (Maguro)	005					
	Big-eye (Menpachi-shibi) ("Bluefin")	006					
	Kawakawa	007					
SWORDFISHES (A'U) 008	Striped Marlin	009					
	Black Marlin	010					
	Short-nose Marlin	107					
	Silver Marlin	108					
	Broadbill Swordfish	011					
	Au lepe (Sailfish)	012					
Mahimahi		013					
Ono		014					

BAIT REPORT

BAIT FISH		DATE TAKEN	TIME TAKEN† DAY	TIME TAKEN† NIGHT	LOCALITY TAKEN	QUANTITY TAKEN	QUANTITY USED
Nehu	41					buckets	buckets
Iao	42					buckets	buckets
Opelu	20					fish	fish
Sardines	07						pounds

* Value represents the amount of money received by the fisherman for total pounds of fish sold. Do not record price per pound.
† Check one to indicate whether baiting was done at day or at night. Applies to livebaiting only.

The above reports are true, correct, and complete to the best of my knowledge and belief.

Signature..... Port of Landing.....
Permittee or Authorized Agent

Island.....

THIS COPY FOR DIVISION OF FISH AND GAME

APPENDIX FIGURE 4.—Fish-catch report form; introduced in July 1950 as standard form for reporting live-bait (skipjack) and flagline (longline) fishing.

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

AKU CATCH REPORT

DIVISION OF FISH AND GAME TERRITORY OF HAWAII

C-4

Name of Permittee..... Boat Permit No.. ..... Month ... 19....

Name of Boat..... F.G. No. Type Fishing. .

Day of Landing	Area of Catch	Port of Landing	AKU (Skipjack) 002		AHI (Yellowfin) 003			MAHIMAHI 013			KAWAKAWA 007			OTHERS				OTHERS			
			Lbs. Caught	Value*	No. Caught	Lbs. Caught	Value*	No. Caught	Lbs. Caught	Value*	No. Caught	Lbs. Caught	Value*	Species Caught	No.	Lbs. Caught	Value*	Species Caught	No.	Lbs. Caught	Value*

BAIT REPORT

Date Taken	Locality Taken		Time Taken † Day	Time Taken † Night	SPECIES TAKEN Nehu 41	SPECIES TAKEN Iao 42	SPECIES TAKEN Other (Give Name)./	Quantity Taken in Buckets	Quantity Died in Buckets	Quantity Used in Buckets	Quantity Left Over in Buckets

The reports contained hereon are true, correct, and complete to the best of my knowledge and belief.

Signature . . .
Permittee or Authorized Agent

* "Value" represents monies received.

† Check one to indicate whether bait ing was done day or night

/ Check either nehu or iao—write out name of bait fish if other than nehu or iao.

Appendix Figure 5.—Presently used fish-catch report form; introduced in July 1954 as standard form for reporting live-bait (skipjack) fishing only.

DIVISION OF FISH AND GAME
Board of Agriculture and Forestry
Territory of Hawaii

AKU BOAT INTERVIEW SHEET

(Confidential)

Interview Date..... (MONTH DAY YEAR)

Catch Date ..... (MONTH DAY YEAR) Boat ..... Captain.....

Time Began to Scout for Fish.....

First School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Second School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Third School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Fourth School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Fifth School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Sixth School Fished: From.....to..... Total Wt.....Av. Wt.....

Catch Locality ..... Am't. of Bait Used.....

Schools Sighted Not Fished

TIME	LOCALITY	ESTIMATED SIZE OF SCHOOL	ESTIMATED AV. WT. OF FISH

Finished for Day ..... Number of Fishermen on Boat.....

BAIT FISHING

	DATE	SPECIES	%	AMOUNT CAUGHT IN BUCKETS	CATCH LOCALITY	TIME SPENT TO CATCH BAIT
Day Bait						
Night Bait						

Amount of Bait Died.....
(IF POSSIBLE GIVE SPECIES AND AMOUNT BY PERCENT)

Amount of Bait Left.....
(IF POSSIBLE GIVE SPECIES AND AMOUNT BY PERCENT)

Remarks (Sufficient bait for day's fishing, schools fished for but no fish caught, etc.):.....

CONFIDENTIAL

APPENDIX FIGURE 6.—Skipjack interview record form.

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AN ALL-PLASTIC DART-TYPE FISH TAG[1]

DANIEL T. YAMASHITA and KENNETH D. WALDRON
Pacific Oceanic Fishery Investigations
Honolulu, T. H.

INTRODUCTION

The Pacific Oceanic Fishery Investigations (POFI), of the U. S. Fish and Wildlife Service, has been studying the skipjack (*Katsuwonus pelamis*) in Hawaiian waters as part of its program to assist the fisheries of the Pacific area. Two aspects of the biology of the skipjack on which there is presently little information are its migrations and growth. Tagging offers a direct means of obtaining information on these problems.

Employing the principle of the harpoon and utilizing plastic materials, a new fish tag has been developed which appears quite promising. The present model, patterned to some extent after the Woods Hole dart tag (through personal correspondence), has been designated the POFI D-2 tag.

Recoveries have been markedly higher than those from tags used in earlier large scale tuna tagging programs. For instance Godsil (1938) tagged 4,000 yellowfin tuna (*Neothunnus macropterus*) and skipjack with opercular disk tags and obtained no recoveries. The first successful tuna tag was developed by the California Department of Fish and Game (Wilson, 1953). This tag, in the form of a loop of plastic tied through the flesh immediately posterior to the base of the second dorsal fin, gave worthwhile returns on yellowfin tuna and albacore, but returns were low on skipjack. Our own experience is illustrative. Between 1954 and 1956, 1,961 skipjack, tagged in Hawaiian waters with the California tag, yielded 12 returns, including three from the stomachs of predators. This rate of predation may be attributed to the length of time required to attach the type G tag. As a result of its struggles during this period the skipjack is in a weakened condition when returned to the water. In this weakened condition skipjack tagged with the type G tag are more susceptible to predation than are skipjack tagged by a more rapid method. In contrast, 747 of 8,161 skipjack, that were tagged with dart tags in 1957, have been recovered, none in the stomachs of predators. Recoveries are still being made, and to date, the longest time at liberty has been 260 days. Recoveries from individual groups of 3,224 and 2,291 skipjack, tagged and released in 1957, equal 11 and 13 percent respectively.

The probable reasons for the success of the new tag are: (1) its application involves minimum handling of the fish; (2) it remains firmly anchored in the fish; (3) it is small and offers little resistance to the

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flow of water; and (4) it does not interfere with the fish's normal activity. An additional advantage is that the speed of application permits operators to release a maximum number of tags during the course of tuna live-bait fishing.

With respect to other fishes, the Wisconsin Conservation Department (personal communication) has conducted pond tests on lake sturgeon (*Acipenser fulvescens*) and found the tag better than other types used. They also obtained preliminary results suggesting the tag could be used on walleye (*Stizostedion vitreum*) and lake trout (*Cristivomer namaycush*).

CONSTRUCTION

Tag

The POFI D-2 tag (Figure 1) has two parts, a head with a barb and a streamer. The head is a Lucite rod, thirteen-sixteenths of an inch in length, and the streamer is a plastic tube five inches in length. The

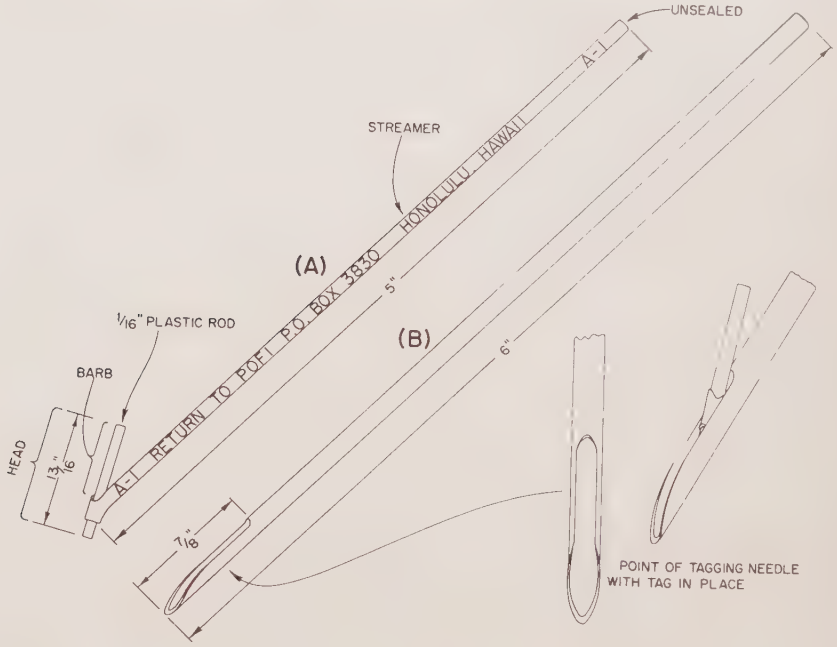

FIGURE 1. Diagrams of: (A) POFI D-2 tag and (B) tagging needle.

head is passed through a 45-degree cut made one-eighth inch from one end of the streamer, and these two parts are fastened together with a waterproof glue. A legend and serial number are printed on or contained within the streamer. The component parts and labor involved in fabrication of 1,000 tags is estimated at $95, while the cost of producing 100 needles approximates $57, but these latter are reusable and losses are minimal (Table 1).

TABLE 1
Components and Cost of POFI D-2 Tag and Needle

Part	Description	Manufacturer or other source	Cost
Tag			
Head	Lucite rod (1/16 in. dia.)	Local plastics supplier	$5.40/1,000 tags
Streamer	Resinite EP-2 AWG size 13	The Borden Company Chemical Division P.O. Box 1589 Santa Barbara, Cal.	$5.85/1,000 tags
Waterproof glue	Seal-All	Allen Products Corp. 20450 Sherwood Ave. Detroit 34, Mich. (obtained from local hardware supply)	$0.34/¾-oz. tube
Legend	Machine printed, using vinyl plastic ink	Printing by: Hugh C. McCoy 16400 Third Ave., SW. Seattle, Wash.	$25.00 + $0.225 (ink)/1,000 tags
Ink	Black vinyl plastic (No. 104N5A4)	California Ink Co. 546 Sansome St. San Francisco, Cal.	$1.35/4-oz. bottle
Labor	Serial number and assembly	Mr. James Suyenaga 1172 Puu Poni St. Pearl City, T. H.	$55.00/1,000 tags
Total cost/1,000 tags			$95
Needle			
Stock	No. 3 tempered stainless steel 5/32 in. OD × .016 in. wall	Tubesales, Inc. 2211 Tubeway Los Angeles 22, Cal.	$54.00/100 ft. (= 200 needles)
Labor	Cutting groove and sharpening point	Precision Industries 754 S. Queen St. Honolulu, T. H.	$30.00/100 needles
Total cost/100 needles			$57

Tag Modifications

The head on the present tag is blunt at both ends, whereas the earlier models had a sharpened barb to aid in firmly anchoring the tag. Sharpening the barb was found to be unnecessary.

The original streamer consisted of a clear plastic jacket, to which the head was attached, and a red or blue tubular plastic insert which bore the legend. A red, printed paper slip was later substituted for the plastic insert, and this gave a more readable legend. To protect the paper or plastic insert, the end of the outer jacket was plugged with a short piece of Lucite rod dipped in glue. The most recent modification of the streamer involves printing the legend and serial number, one at the base and another at the end of the streamer, directly on a red opaque tube, thus eliminating the insert and the plug. The red is preferred to the blue because the legend is more legible and the color is more obvious to the human eye.

Recovered tags have shown some fading of color and legend on the streamers and streamer inserts. This appears to have been caused by sunlight, because on many of the tags only the upper side of the protruding portion of the streamer is faded. The under side and the portion of the streamer inside the fish retained the color and legend. Efforts are being made to find an ink and a plastic that are less affected by sunlight.

Tagging Needle

The tag is inserted with a stainless steel needle (Figure 1B) similar to that used for California type G tags. The point is cut as shown in the figure, so the tag head will be held securely. Without this feature the tip slips out of the groove, the head turns across the axis of the needle, and the streamer is cut off when the needle is inserted into the fish. The needle should be of sufficient length so that the end of the streamer does not protrude.

TAGGING PROCEDURE

Before fishing begins, a number of needles are loaded with tags and bound in bundles of 10. On most POFI trips, 400-500 needles are so prepared. Each bundle is labeled with a slip of waterproof paper bearing the serial numbers of the tags. Since individual measurements of fish are not taken it is not necessary to identify individual tag numbers at the time of tagging. Instead the labels and the unused tags from a bundle of 10 are retained and checked after each fishing period or day to determine what numbers were released. A tagger can carry as many as 100 tags in the pockets of a canvas apron.

The D-2 tags have been employed principally in tagging skipjack caught by pole-and-line fishing. Tags of five-inch length have been used satisfactorily on fish ranging from 2 to 25 pounds. In the fishing operation, as commonly practiced by Hawaiian fishermen, skipjack are hooked, swung up, caught under the left arm, and unhooked. The tagger stands one to two feet behind the fishermen; ordinarily there is one tagger to two fishermen. After the skipjack is caught and while the hook is being removed, the tag-bearing needle is inserted usually from the right side, about one-half to one inch below the crest of the back and between the end of the second dorsal fin and the insertion of the first dorsal finlet. When the needle is removed, the barb holds the tag in place. The needle should form an angle of about 45 degrees with the body surface of the fish, and should be inserted with the barb next to the fish and deep enough so that the head of the tag crosses the median sagittal plane. The barb will then lodge against a neural spine and firmly anchor the tag in the fish. If the tag is inserted with the barb next to (Figure 2A), rather than away from (Figure 2B) the side of the fish, the tag will also be firmly anchored, even though the head does not cross the sagittal plane. The exact placement does not seem important as long as a major blood vessel is not injured. It is important that the end of the streamer does not reach the caudal fin, or the fin will be frayed by swimming movements of the fish. Small fish should be tagged anterior to the second dorsal fin in order to prevent this injury of the caudal fin.

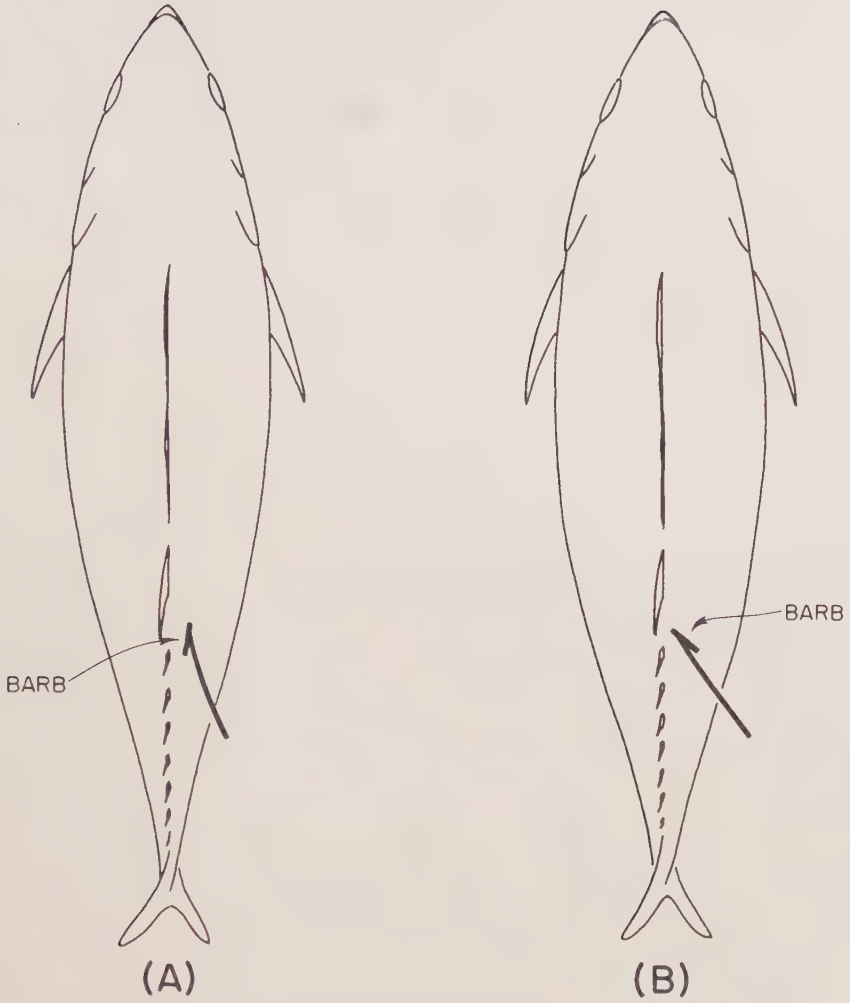

FIGURE 2. Diagrams showing dorsal view of tagged fish with barb inserted (A) next to and (B) away from side of fish.

Individual skipjack may be hooked, tagged, and returned to the water in as little as four seconds. Measurements of skipjack cannot be taken in this short time; instead, the size of tagged fish may be estimated from measurements of untagged fish caught from the same school. This estimate is considered to be reliable, because it has been shown that skipjack school by size (Brock, 1954).

EFFECT OF TAGGING ON FISH

Underwater observations of tagged skipjack indicate that they are not greatly affected by the tagging procedure nor by the presence of the tag. Tagged fish were observed to sound, then return to the portion

of the school around the vessel. There have been seven instances in which tagged skipjack were recovered within minutes of being released. During the fall of 1957 one skipjack was tagged twice and released twice. The fish was initially tagged and released on November 20th. Three days later it was recovered by POFI fishermen and a second tag was inadvertently placed on it before it was again released. Fourteen days later this twice tagged skipjack was recovered by a commercial fisherman.

The tagging wound heals rapidly with no infection. Scar tissue is present within 10 days of tagging and well developed within a month. The scar tissue does not usually fuse to the tag but forms a tight, glove-like pocket around the head and streamer. The external wound is small, scarcely larger than the streamer (Figure 3).

SUMMARY

An all-plastic, dart-type fish tag was used with considerable success on skipjack in Hawaiian waters during 1957. Recoveries from individual groups of 3,224 and 2,291 fish equalled 11 and 13 percent respectively. In addition to the high percentage of recovery the tag has

FIGURE 3. Skipjack with D-2 tag recovered 30 days after release. Tag pulled forward to show small wound and growth of new skin around opening. *Photograph by K. D. Waldron, June, 1957.*

other desirable characteristics such as: (1) small size; (2) simplicity and rapidity of application; (3) low resistance to water flow; (4) secureness when attached properly; (5) negligible effect on the natural movements of the fish; and (6) one uniform size may be used on fish weighing between 2 and 25 pounds. Because of these advantages the dart tag should be suitable for use on a great variety of fishes.

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